# the Atom

Los Alamos Scientific Laboratory

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## IN THIS ISSUE



## REGULAR FEATURES




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### PHOTOGRAPHY

Bill Jack Rodgers, Johnnie Martinez, Henry Ortega, Hale Observatories (page 5).

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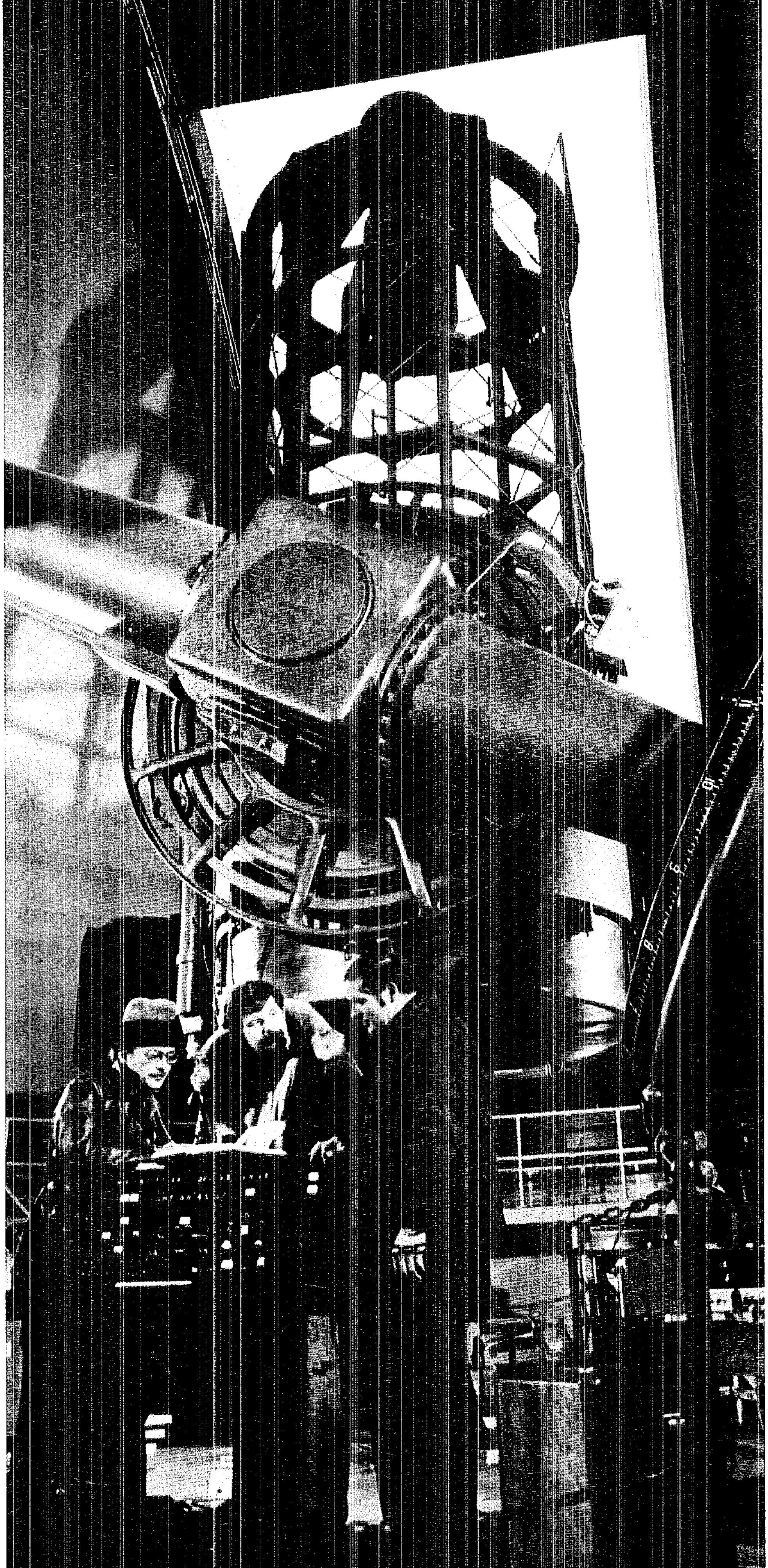
### COVER

The University of Texas McDonald Observatory at Mount Locke, Texas, was visited recently by a LASL team to conduct infrared astronomy. Accompanying the team was photographer Bill Jack Rodgers, ISD-1, who took the cover photo of the observatory housing the 82-inch telescope to which the LASL-developed equipment was connected. Although the photo was taken in daylight, a little darkroom "black magic" produced the moonlight effect.

The 3 LASL investigators shown above at the observatory are Charles Gow, Brook Sandford, and Kent Honeycutt. For more on astronomy at LASL, see the article beginning on the opposite page.



# LASL EXPLORES OUTER SPACE

Ever since man developed an intelligence sufficient for something more than animal survival, he has contemplated the heavens in awe and wonder. Astronomy is the oldest science and one of the most useful. From it, man has garnered knowledge by which to plant his crops, navigate his ships, and, more recently, understand something of the burning of the stars themselves so that their fires may someday be reproduced to generate useful energy on earth.

Since World War II, scientists at the Los Alamos Scientific Laboratory have studied stars because some of the processes by which stars produce energy are the same as by which energy is produced in thermonuclear weapons. The best known contribution along this line was made by Hans Bethe, professor of physics at Cornell University, who played a key role in the development of fission weapons at Los Alamos during World War II and in the later development of the first thermonuclear devices at Los Alamos. Bethe had published a paper in 1938 titled "Energy Production in Stars" which, for the first time, attributed the enormous energy production of the sun and other stars to fusion processes. Bethe was awarded the Nobel prize in physics in 1967 for this achievement.

Charles Gow, Brook Sandford, and Kent Honeycutt connect new infrared enhancement equipment they developed at LASL to the 82-inch telescope at the McDonald Observatory in Texas. The investigators hope to obtain data of stars forming in dust clouds.

Elaborating on this aspect of astrophysics, Ian Strong, P-4, says, "Stars are ideal thermonuclear laboratories, generating plasmas at densities and temperatures impossible to duplicate on earth. Since plasmas are intrinsic to the thermonuclear process, the knowledge we can gain by observing stars may contribute in important ways to our controlled thermonuclear research."

But there are other aspects having to do with national security. When the Limited Test Ban Treaty was implemented in 1963, means of surveillance were needed to monitor both the atmosphere and space beyond for violations. The Vela satellite program, with LASL-developed instruments aboard, was one of the means created to meet this need.

Thus, astrophysicists and astronomers are among the staff members of J-Division, part of whose activities has to do with studying phenomena associated with thermonuclear reactions, and of P-Division, whose Group P-4 is responsible for designing instrumentation for Vela satellites.

Other programs with pragmatic purposes, some of which have to do with national security, have been in existence for years. These include barium injections launched from Alaska, Canada and Hawaii to study Earth's magnetosphere (*The Atom,* January-February 1975 and July-August 1975) and the development of instruments for planetary probes, such as Mariner 10 to Venus and Mercury, and Pioneer 10 to Mars, Jupiter, and Saturn *(The Atom,* January-February 1974). Also, LASL investigators have been avid solar-eclipse chasers, racing the sun in aircraft and launching instrumented rockets to study the coronal plasma *(The Atom,* September 1973); and flying high to study comets (*The Atom,* November-December 1973).

For the satellite programs, Group P-4 (High-Altitude Physics) has not only developed the necessary instruments, but has processed and interpreted the information obtained. An idea of the extent of this activity can be gleaned from the fact that Group P-4 has grown to more than 50 employees.

One of the most important astronomical instruments used by astrophysical researchers at LASL is not an observatory telescope (LASL has none), but LASL's Central Computing Facility (CCF). Modern astronomy requires the processing of massive amounts of data. The CCF's high-speed, high-volume capability is a factor that has been essential to LASL's functioning as an important astronomical and astrophysical center.

While LASL's astronomical and astrophysical involvement has been long-standing, it is little known in the world at large. It comes as a surprise to many to learn just how extensive and intensive this involvement is. Some indication of this involvement is shown by a distribution list for notifying staff members of impending visits by astrophysicists and astronomers, and transmitting literature of interest. Today, more than 90 LASL staff members and postdoctoral researchers are on that list, and the number is growing, according to Arthur Cox, T-DOT, who acts as an unofficial coordinator for these matters. "There are more than 25 staff members and postdocs at the Laboratory with Ph.D. degrees in astrophysics or astronomy and at least 30 staff members are engaged in our various programs," Cox says. LASL is a major astronomical and astrophysical research center, despite having no astronomical division as such. Activities are summarized annually in a voluminous "Observatory Report." The most recent issue also lists more than 80 papers published by LASL researchers.

### Our Crowded Space

Once space seemed to be a fairly tidy thing. In it were hung immovable balls of fire, of various sizes and ages, called stars. Stars, for the most part, were organized into disk-shaped galaxies, some of which were also spirals.

In the early 20th Century, Albert Einstein threw a curve into this neat picture with his relativistic bombshells. Space became curved, creating a universe both infinite and closed in the manner of a fat soap bubble. Gravity bent light, whose speed, in turn, became the only constant one could trust. Matter and energy became one, and strange things happened to time, mass, and dimensions on hypothetical spaceships travelling at close to the speed of light.

But that was only the beginning. Today space is populated by more mysterious objects than ever: black holes, neutron stars, quasars, and pulsars, to name a few. These bodies and other sources radiate more than visible light: space appears "cluttered" with radio waves, gamma rays, x rays, and infrared radiation.

Very much interested in infrared radiation are Brook Sandford, J-9, John Jekowski, EG&G, Kent Honeycutt, associate professor of astronomy from Indiana University, and Charles Gow, postdoctoral appointee from Indiana University. "Protostars, that is, clouds of dust and gas that appear to be forming into stars, do not appear to be very hot. At low temperatures the clouds do not radiate visible light we can detect. However, as those clouds contract, about half of the energy produced is in the form of infrared radiation," Gow says. "Infrared is the only way we can really look at those clouds."

The problem of infrared astronomy has been the poor sensitivity of photographic emulsions to infrared wavelengths. If simply exposing for long periods of time would compensate for this, there would be less of a problem. Unfortunately, such detractions as background and the shimmering effect caused by the earth's atmosphere enter in, making sharp and detailed images virtually impossible to obtain by conventional photographic means.

A unique opportunity to make a radical advance in infrared astronomy was presented by the availability of very sophisticated, very expensive image-intensifying equipment originally acquired by Group J-10 for recording barium streaks formed during magnetospheric studies. The 4 scientists built a system linking the intensifier to a television tube and a video storage device. A computer program was written to edit the images and minimize the background.

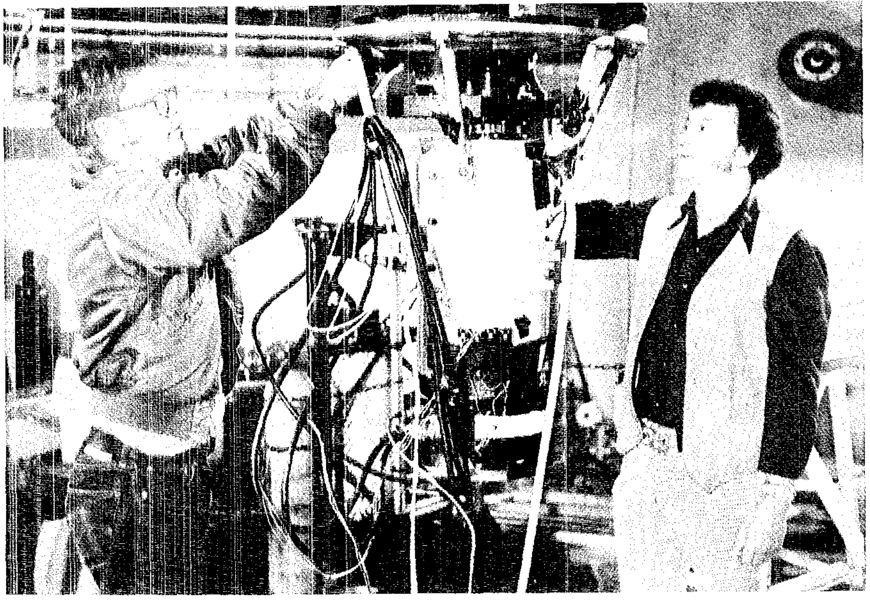
The result is a whopping 100,000-time increase in sensitivity over photographic plates, with the added advantage that the data are also in digital form suitable for storage and processing. This allows vastly superior images to be made in a matter of seconds or minutes.

Such a leap forward in capability is not without its price. The equipment is very difficult to operate and can be damaged easily. You just can't pack it and ship it to an observatory with instructions, but must send experts to operate it. The intensifying tube must be chilled by dry ice; chilling or warming it too rapidly can ruin it.

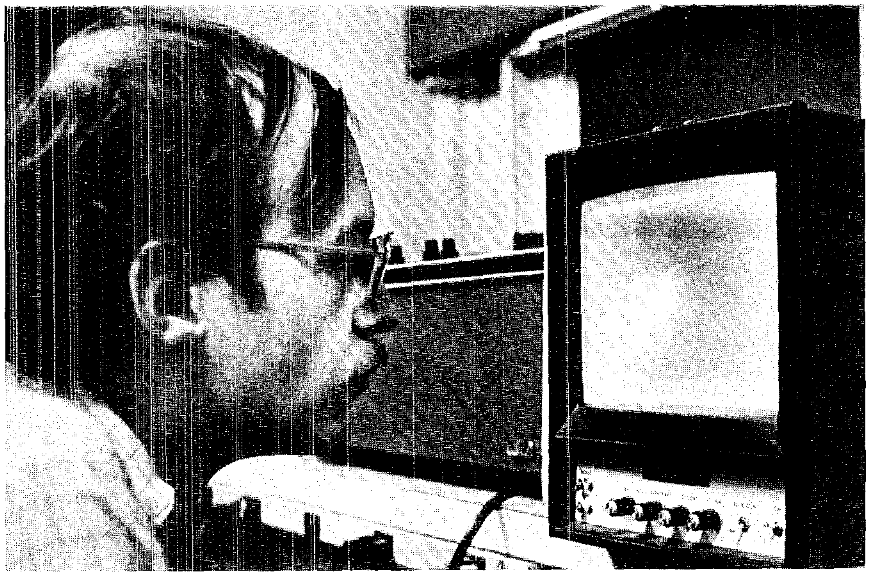
But it's worth the price. In early February, Sandford, Honeycutt, Gow, and EG&G electronics technicians Pete Olivas and Herb Holmes connected the equipment to the 82-inch telescope of the University of Texas McDonald Observatory at Mount Locke, Texas. Some striking images of a dust cloud in the Orion nebula were obtained.

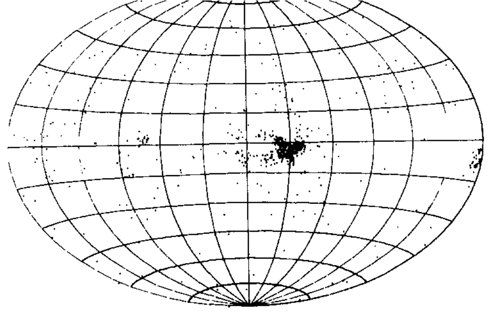
Data from these images will have to be processed before findings of any certainty can be announced. Yet, photos taken from the face of a monitor show what could be stars being formed from contracting interstellar dust. If so, these and subsequent photos made by the advanced technique may vastly increase our understanding of star formation.

Although looking at "lukewarm" dust may be the equipment's usual application, there are others, such as searching for small, cool, low-mass dwarf stars which nevertheless

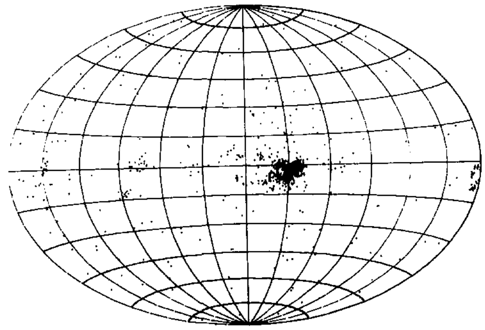


Herb Holmes and Pete Olivas, both EG&G, set up infrared image-enhancement equipment on the 82-inch McDonald Observatory telescope, above. Below, Gow observes the image of a dust cloud in the Orion nebula. At bottom, the dust cloud is shown in greater detail; dark areas within the cloud appear to be stars forming.





VELA SATELLITE 5A



VELA SATELLITE 5B

**Looking over a computer graphic display of x-ray sources mapped by Dick Belian (left foreground) are Group P-4 colleagues involved in x- and gamma-ray research. From left to right are Ray Klebesadel (standing), Ian Strong, Doyle Evans (seated), Roy Olson, and Jerry Conner. At right, more than 1,000 x-ray bursts (lasting from 9 to 124 seconds) are plotted from data taken from 2 Vela satellites; the close agreement is striking. The intense source on the galactic equator is located in a spiral arm of our own galaxy near the galactic center. The galactic equator does not correspond to earth's equator. The intense source shown would actually be found in earth's southern sky.**

radiate infrared heat. Some theorists hold that the observed masses of galaxies are not sufficient to account for the galaxies' gravitational fields. If such "cinders" can be detected, they could account for the missing mass.

### Invisible Sources of Invisible Light

As important as LASL's contributions to infrared astronomy may prove to be, a longer established and more extensive activity at LASL, and one in which LASL has developed special expertise, is x- and gamma-ray astronomy.

Although LASL had placed instruments aboard early rockets, the x- and gamma-ray "data explosion" really began in 1969 and 1970 with the placing of LASL-built instruments aboard Vela 5 and 6 satellites. The deluge of data has flowed from both surveillance and basic research instruments on these satellites.

On earth to process this mass of data and organize it in coherent form have been Group P-4's Jerry Conner and Dick Belian for x rays and Ray Klebesadel, Ian Strong, and Roy Olson for gamma rays. Switch-hitting between both "teams" has been Doyle Evans.

The first observation of the complete lifetime, about 3 months, of an x-ray nova came from Vela data in 1969. Belian later discovered the first very brief (less than 1 minute) x-ray transient source and has since mapped over 1,000 such short x-ray bursts. Klebesadel, Strong, and Olson identified intense gamma-ray bursts from cosmic sources and speculated on their origins, authoring numerous papers on the subject. No firm connection has been established between the sources of gamma-ray bursts and x-ray bursts.

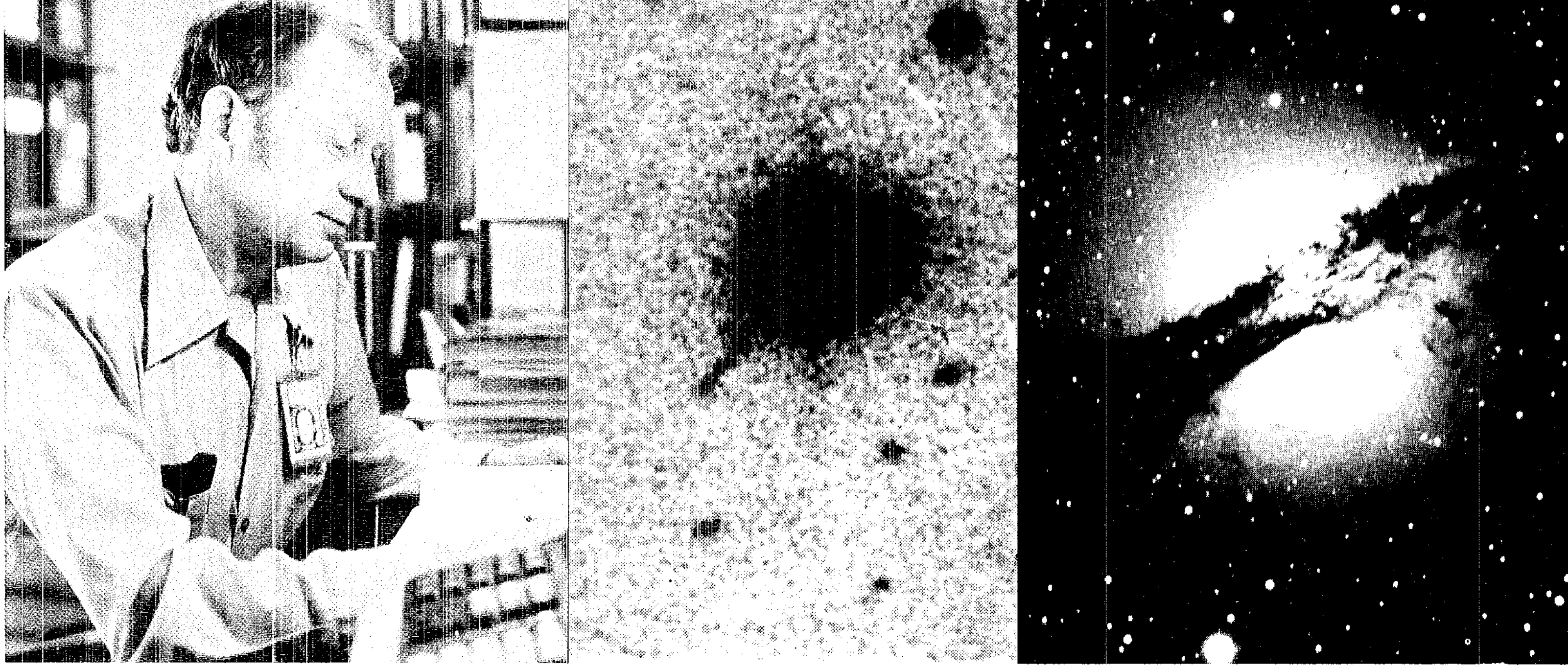
Yet, the sources have much in common. Even the less energetic x-ray bursts represent, at their peaks, a fantastic output of energy: as much as 1 million times the total output, in all wavelengths, of the sun. Some bursts, of both types of radiation, peak so rapidly that they could emanate only from or near very small, but extremely dense, objects such as neutron stars or black holes.

Whatever the origins and meanings of these bursts, the contributions of Group P-4 in providing the essential data to the astrophysical community-at-large represents an important scientific contribution.

### Quasars—Really Far Out?

The most awesome single objects in the universe are quasars—immense, very energetic starlike bodies moving away from us at tremendous speeds. That they are also very distant has been the belief of most astronomers since quasars were discovered in 1963.

However, certain features of this view have disturbed Jim Terrell, L-2. For one thing, his calculations suggest that not even gigantic, fiercely burning quasars could generate sufficient light to be perceived so brightly on Earth if quasars were as distant as supposed. For another, very fine angular measurements of radio sources within quasars show these sources separating, in 3 cases, at about 10 times the speed of



**Jim Terrell, L-2, has stirred up controversy by formulating a theory of the origin and nature of quasars opposed to current widespread belief. Quasars, such as "3C-273" with its mysterious jet, center, may be extraordinarily large distant objects or, as Terrell suggests, much closer and smaller objects ejected from our own galaxy. Recently, blue objects have been discovered within regions of intense radio-wave emissions in Centaurus A galaxy, right. Terrell proposes that these are quasars, ejected from that galaxy, which are also generating the radio signals. Many basic characteristics of quasars, such as their size and whether they are single bodies or clusters of objects, are unknown.**

light, a "phenomenon" that Terrell calls "highly unlikely."

Terrell maintains that simply because a body is observed, by its red shift, to be moving away from us at relativistic speed (approaching the speed of light), it does not necessarily follow that it must also be billions of light years away, reasonable as that conclusion may be for galaxies. He suggests that at least some quasars may have originated in our own galaxy in fairly recent times. The centers of galaxies are unusual places: space is densely packed with stars and other matter, and violent processes frequently take place in these "vortices." From time to time during these violent periods, some of this matter—in huge globs—may have been ejected as quasars travelling at tremendous speeds from the galactic hub, says Terrell. Their lack of apparent motion across the sky, he maintains, is because their trajectory is nearly directly away from us, like that of an arrow if it were shot from a bow held in our hands.

Terrell's work has been widely published and, as might be expected, vigorously debated.

### Stellar Cardiograms

Looking at a special breed of stars in an unusual way is Art Cox, T-DOT. He studies stars that pulsate, like hearts throbbing in space. More accurately, he studies their cardiograms, or records of their pulsations, derived from optical data gathered by observatories around the world.

"Only 1 star in a million pulsates," Cox explains. Then he adds, "It is not that pulsating is an oddity. Rather, it is a part of the normal life cycle of the more massive stars. However, a star's pulsating period lasts but a very short time, astronomically speaking — about 10 million years—during a star's lifespan of billions of years. Thus, only a few are pulsating at any given time."

Cox explains that while such a body may be interesting, not much can be learned from a star that is pulsating in but a single mode. He searches for the 1 star in a billion that is pulsating in 2 or more modes. Cox compares stellar modes to a violin string that vibrates not only in its fundamental mode, but also in overtones. In fact, one such mode, where the star's center is compressing while its shell is expanding, is called the first overtone.

Analyzing the 20 or so stars discovered to date that are pulsating in 2 or more modes provides accurate measurements of their masses and radii, according to Cox. This valuable information leads to better understanding of the whole life cycle of these stars, including their characteristics during their earlier and later evolutionary stages. The characteristics may also be attributed to similar stars not presently pulsating.

### Cosmic Wrestling

Like the Jacob of the Old Testament who wrestled with God, there is something audacious about scientists who wrestle with the ultimate question: the nature of the universe itself.

At LASL, one such wrestler is Grady Hughes, J-DOT and a postdoctoral appointee who became involved in cosmology while studying

**Arthur Cox, T-DOT, and Grady Hughes, J-DOT, here discussing a computer printout, are both involved in "far-out" astronomical work. Cox analyzes pulsating stars and Hughes' studies are cosmological in scope and have to do with the nature of the universe.**

with Charles Misner, professor of physics and astronomy at the University of Maryland. Hughes is particularly interested in the shape of the universe or, more accurately, whether or not it is isotropic. An isotropic medium is one whose properties appear to be the same regardless of the direction from which they are observed.

To find answers, Hughes is engaged in a number of studies, such as how deuterium, helium, and other light nuclei were formed 10 billion years ago at the instant of the "Big Bang" (a theory of the origin of the universe accepted by most scientists today).

Although there is wide agreement as to the origin and age of the universe, there is no such agreement as to its present state and ultimate destiny. If Hughes can find clues that the universe is anisotropic (not isotropic) in one "form," this would support an "open" universe of infinite extent. In this model, receding objects would eventually vanish, energy would dissipate, and the universe would die.

However, if the universe is anisotropic in another "form," this would support a "closed" model (one, nonetheless, without boundaries) in which matter from the "Big Bang" would reassemble, compress, and generate another "Big Bang." It would seem a fair assumption that this cosmic birth-life-regeneration cycle could have been going on—and would continue to go on—through eternity.

The establishment of one model or the other would have far-reaching implications not only for science, but for theology and philosophy as well.

### Into the Wild Black Yonder

And so it goes throughout LASL: a multitude of programs in being concerning our own solar system, such as studies of the material properties of comets by Walter Huebner, T-4, to "far out" advanced theoretical studies by Susan Ames, postdoctoral researcher from the University of California, concerning energy processes near black holes, and work by Robert Deupree, T-DOT, on the convection of matter within pulsating stars. These and other projects, impossible to document in a single article, constitute the serious business of astronomy and astrophysics at LASL.

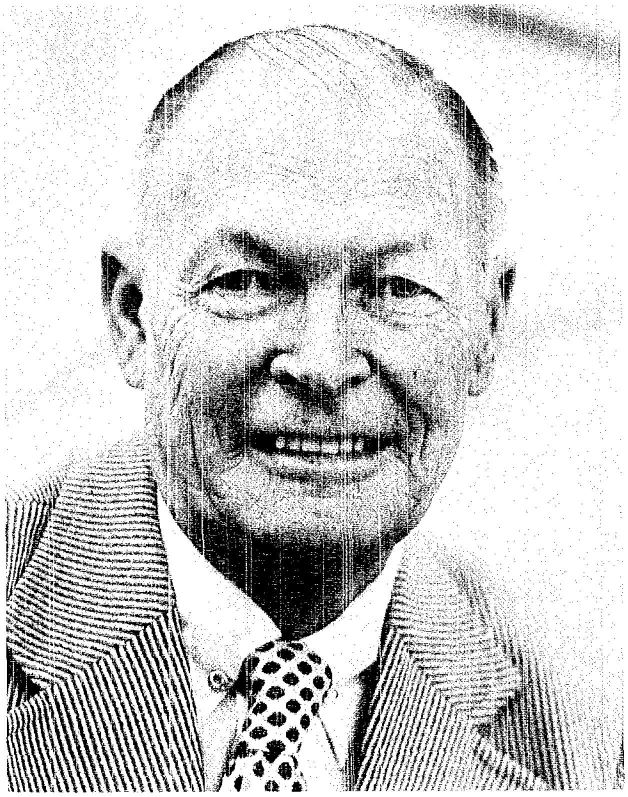
At the same time, there is both excitement and occasional flashes of humor associated with the fields.

The excitement comes as new and improved methods of observation, such as x- and gamma-ray detection and infrared enhancement, produce new and surprising data. This, in turn, leads to innovative and sometimes radical theories to account for the new findings.

The humor comes as scientists explain the phenomena they have observed or express one viewpoint or another in the debates that such explanations usually engender. For instance, one non-believer of the black-hole theory dismisses black holes as another way of saying that mathematics has failed. A scientist describes a nova as simply a star shedding its skin. And the daughter of a noted astronomer paraphrased quasi-stellar objects as "crazy stellar objects."

But behind the excitement and the occasional flashes of humor, the astronomical and astrophysical research goes on, serving important national-defense needs and leading to a better understanding of physical processes on earth.

# A Farewell to a Nuclear Pioneer

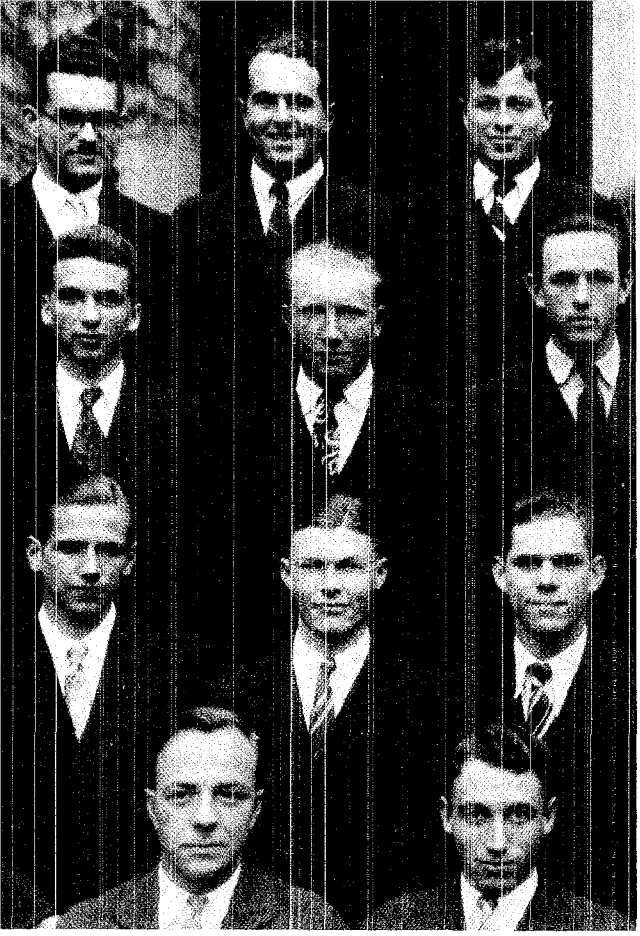


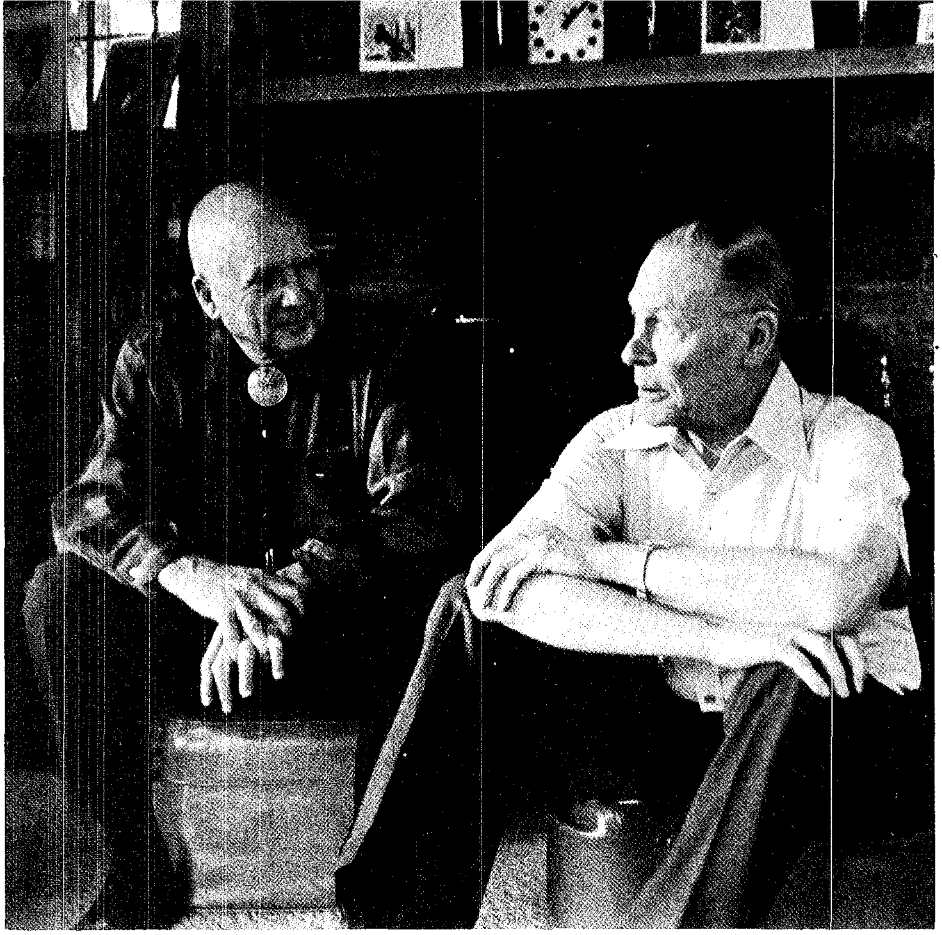
Duncan MacDougall

"Everybody asks me what I'm going to do when I retire. They act sort of puzzled when I tell them I'm just going to relax." So said Duncan MacDougall, associate director for weapons, while recently contemplating his upcoming retirement on April 30.

When asked to elaborate on just what he meant by relaxing, MacDougall made it clear that he meant exactly what the word meant: "Oh, I like music and I'll listen to some records. I'll do some reading. I like spectator sports, so I'll watch some on TV. I'll travel a bit, especially around New Mexico. I haven't seen as much of it as I would have liked." Apparently, MacDougall will bring to his retirement nothing like the intensity that has characterized his career.

That his career has also been brilliant is only partially self evident. In the silent world of nuclear-weapons development, public recognition can but rarely be accorded. Some inkling as to the importance of MacDougall's contributions can be discerned from his having served on the U.S. Air Force Scientific Advisory Board from 1945 through 1948, from his having been awarded the Medal of Merit by President Harry Truman in 1948, and by former Laboratory Director Norris





Then and now. In a 1928 college fraternity photo, Norris Bradbury is at left in the second row from the top, Duncan MacDougall is at center in the third row from the top. In the right photo, the two old friends reminisce at MacDougall's home.

Bradbury's reaction to a question posed by **The Atom.** "Would you say that MacDougall has been one of the key figures in the development of weapons for our national security?" Bradbury was asked. "Oh, yes! Yes, yes, yes!" Bradbury responded, incredulous that anyone would be so naive as to even ask the question.

Bradbury should know. The two are close friends, having been roommates and fraternity brothers at Pomona College, Claremont, California. "We both were graduated summa cum laude, but Duncan beat me out by half a percentage point for the head of the class," Bradbury recalls with mock ruefulness. And MacDougall was best man at Bradbury's wedding.

Long before MacDougall had received his B.A. in chemistry from Pomona in 1929, at the age of 20, and his Ph.D. in chemistry from the University of California, Berkeley, in 1933, he showed scholastic precociousness. His father was a chemistry professor whose family relocated from Texas (where MacDougall was born) to Canada to California to Minnesota and back to California. Upon settling in each new community, MacDougall would enter school at the grade he thought appropriate. He rarely found entering any grade appropriate, thanks to occasional tutoring, and estimates that he spent but a year and a half in elementary school. This may be an academic record of sorts.

To many, MacDougall's professional reserve seems to carry over into his personal life. Intimates say that this is simply the well-known Scotch proclivity for keeping one's private life private. It never occurs to casual acquaintances to question him about his deceased wife, Hildegard, his lawyer son, Peter, or his stepdaughter, Vera Kistiakowsky.

If MacDougall is reserved about his personal life, he becomes articulate when discussing his life's work: weapons and their design in the context of national defense and global strategy. In talking of such things as deterrence, credibility, and the need, as he sees it, of modifying some of America's overseas nuclear stockpile, he expresses intricate concepts in plain words of unarguable good sense. In dealing with nonscientific civilian and military officials in Washington, D.C., this knack is respected and appreciated.

Another trait that has served MacDougall well in a profession where details are all-important is his legendary memory ("terrifying," one colleague calls it). MacDougall can recall long-past events with unerring accuracy: exact dates, people who were there, how they were dressed, and other minutiae.

The same penchant for detail is doubtlessly responsible for MacDougall's fearsome reputation for spotting mathematical and grammatical errors, missed by everyone else, in scientific reports. He takes particular delight in demolishing pomposity and bureaucratese with barbed comments written in the margins.

MacDougall's biography is as sparing in the use of words and as to-the-point as the man himself: National Defense Research Council Explosives Laboratory, Bruceton, Pennsylvania, 1941-1946; Naval Ordnance Laboratory, White Oak, Maryland, 1946-1948; GMX-Division leader, 1948-1970; associate director for weapons, 1970 to the present. However, this resume omits a vital fact: during his earlier employments, MacDougall was assigned to Los Alamos as a consultant for the development of the high-explosive components of nuclear weapons.

MacDougall is a typical, perhaps archetypical, member of that small band of brilliant and, for the most part, anonymous scientists who built the world's first nuclear weapons 30 years ago and have continued to apply their expertise to more advanced devices ever since. Their number diminishes year by year as more and more of them retire. Fortunately, others, equally competent, but of a different generation and with a different style, are beginning to take their place.

Yet, it is not without a certain nostalgia that veterans at the Laboratory will bid a fond farewell to Duncan MacDougall: nuclear-weapons pioneer in a momentous era, and unforgettable as a man.

# appointments announced

Robert Thorn, presently TD-Division leader, will replace Duncan MacDougall as associate director for weapons upon MacDougall's retirement on April 30, according to Harold Agnew, Laboratory Director.

Thorn first worked at the Laboratory as a summer graduate student in 1949, returning to LASL as a permanent staff member of T-Division in 1953. In 1962, he became Group T-2 leader, in 1967 he became associate T-Division leader, and in 1970 he became alternate T-Division leader. When TD-Division was formed in 1971, he became its head.

Thorn earned his A.B., A.M., and Ph.D. degrees in physics at Harvard University. In 1967, he was presented an Ernest O. Lawrence Award by the U.S. Atomic Energy Commission, and he has served on a number of advisory panels to agencies of the U.S. government.

He is a member of Phi Beta Kappa, Sigma Xi, the American Physical Society, and the American Association for the Advancement of Science.

Raymond Pollock, Jr., presently associate TD-Division leader, will become TD-Division leader on May 1.

Pollock joined LASL in 1957 as a staff member of T-Division. He was granted a LASL fellowship for graduate study and earned his Ph.D. in physics from the University of New Mexico in 1967. He was named Group TD-2 leader in 1971 and served a year as associate leader of L-Division when it was formed in 1972. From late 1972 to March, 1974, he served concurrently as associate division leader of both L- and TD-Divisions.

Pollock received the B.A. degree in physics from the University of Colorado in 1953 and the M.S. degree in physics from the University of California, Los Angeles, in 1956. While on leave of absence during 1974 and 1975, he served with the Atomic Energy Commission (and the Energy Research and Development Administration) Division of Military Application in Washington, D.C., where he directed the advanced isotope separation program.

# A Solar Home Comes Home

Just off Pajarito Road near TA-46 of the Los Alamos Scientific Laboratory is an attractive solar-heated modular building that, like Henry Ford's Model "T," could have an impact within the next few years on the country's energy consumption and its economy.

The building is currently being used by Group Q-24, LASL's solar energy researchers, for office space and as a research project that promises to make solar heating and cooling available to the same "man on the street" that Henry Ford put behind the wheel of a Model T.

Like many of the hand-built, expensive automobiles before Henry Ford's time, solar energy has largely remained a somewhat esoteric experiment for those with the time and money to explore a deceptively simple, but usually expensive, alternative to fossil-fuel energy.

LASL's solar-heated module experiment, however, may yield results that could be enjoyed almost immediately by the half million Americans who purchase mobile or modular homes each year.

The module was designed for LASL's solar energy group by the Albuquerque architectural firm of Burns and Peters. Industrial Systems Engineering of Albuquerque engineered the home's solar-heating system to specifications furnished by Group Q-24. The unit was built by Albuquerque Western Industries, who also trucked it to TA-46.

Transporting a 24-foot-wide structure anywhere in New Mexico requires a State Police escort complete with many flashing lights and red flags. Bringing that same structure up the steep and twisting road between Otowi and Los Alamos on February 18 called for considerable skill on the part of the driver of the truck that carried it. It also required Job-like patience on the part of the drivers in the parade of cars that inevitably formed behind the modular home.

This, the first phase of LASL's solar-heated modular home experiment, consists of a 24-foot-wide by 44-foot-long (1056-square-foot) structure of conventional wood frame construction and a floor plan with 3 bedrooms, 2 baths, living room, kitchen, furnace room, and utility room.

On the south side of the home are 340 square feet of LASL-designed, flat-plate air-heating solar collector panels installed at a 60 degree angle and, according to Doug Balcomb, Q-24 group leader, designed to provide about 80 to 85 per cent of the unit's space-heating and hot-water needs in a Los Alamos environment.

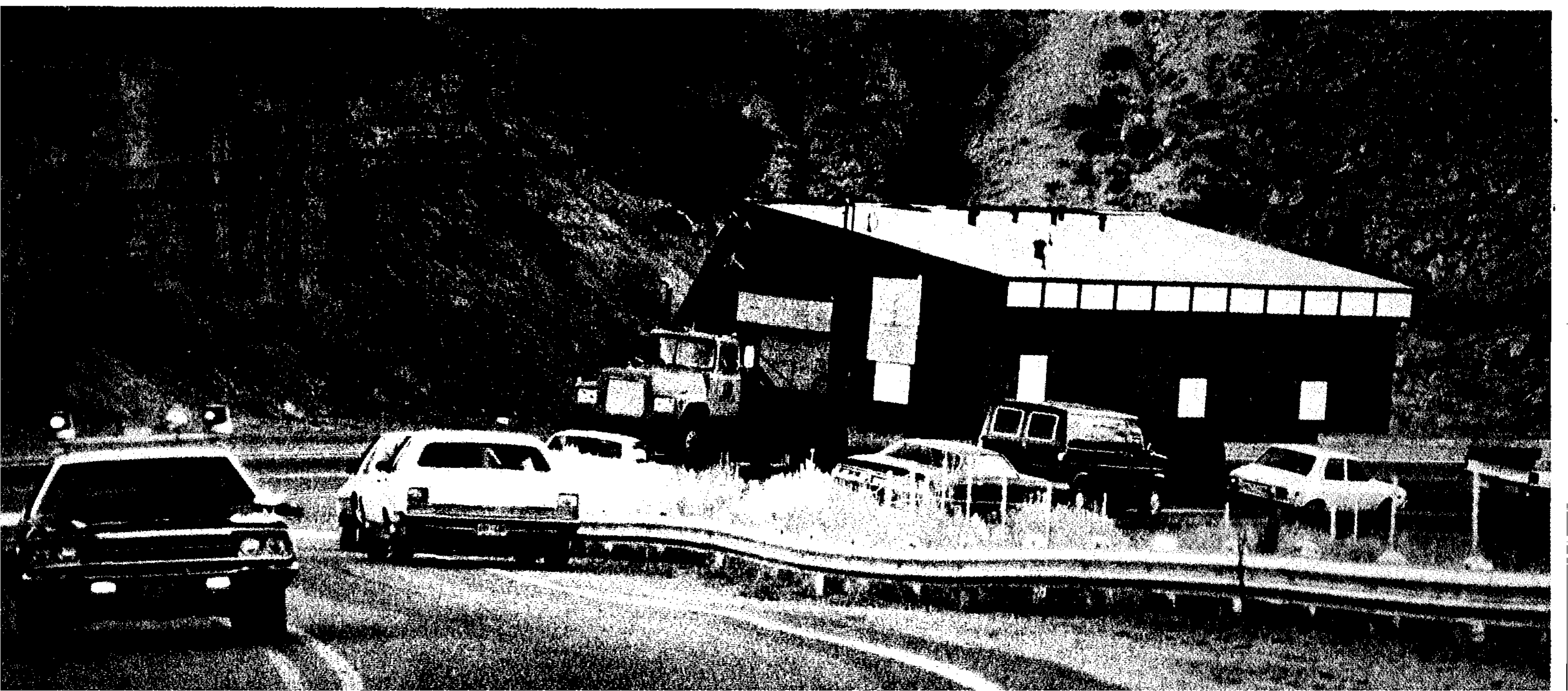
An electrical heating system provides "backup" support for the LASL solar energy system which is designed to suck cool air from the living room and warm that air as it is forced across the solar collector plates. Heat can be stored in the system by rerouting the warmed air to racks containing 1,536 sealed, 1-pint jars of water under the system's control center.

The cost of the module, including the prototype system that heats it, is about $32,000, but that figure, Group Q-24 believes, may well be lowered through mass production to as little as $23,000 based on a production rate of one unit per week.

According to Balcomb, the effort got underway about 2 years ago when he and other energy researchers at LASL began experimenting seriously with solar energy.

"Solar-heating installations are generally expensive," Balcomb says. "We want to make them competitive with other forms of energy, so we turned to assembly-line techniques resulting in units costing about two-thirds what a site-built unit costs."

Balcomb estimates the cost of the solar collectors at about $6.50 per square foot with the balance of the



system (ducts, thermal storage, and controls) bringing that figure up to about $10 per square foot. "At that level," he says, "solar energy is competitive with the current cost of electrical heating or propane, but not with present natural gas costs. However, there are strong indications that the cost of natural gas will escalate and that the supply and availability will be limited."

Four similar homes are planned. The first unit, now installed, has an active solar heating system using forced air heating, whereas the second home will have a passive heating system that will heat by convection and radiation. After these 2 homes are tested, a third unit will be built that will be both solar heated and cooled.

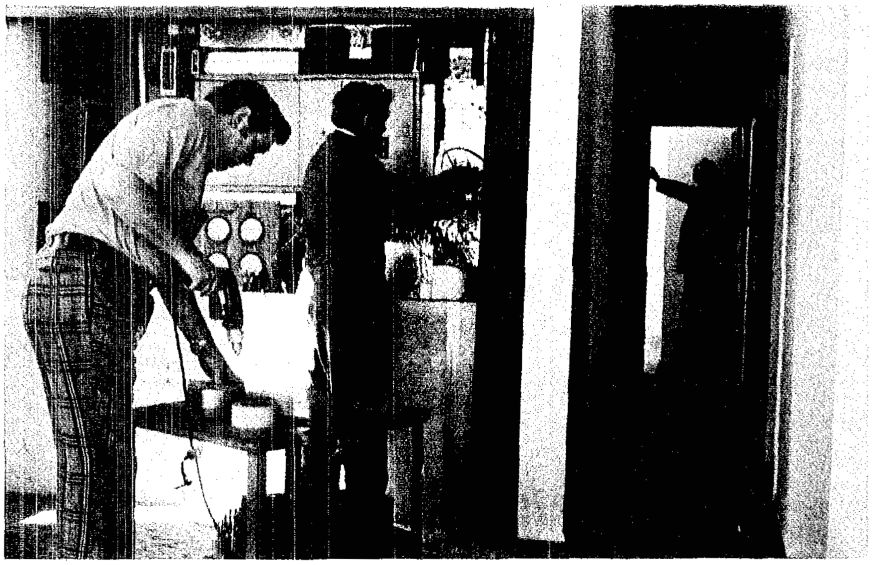
The fourth and final modular home will combine features of the previous 3, and will represent a home with the most economical and practical solar heating and cooling possible.

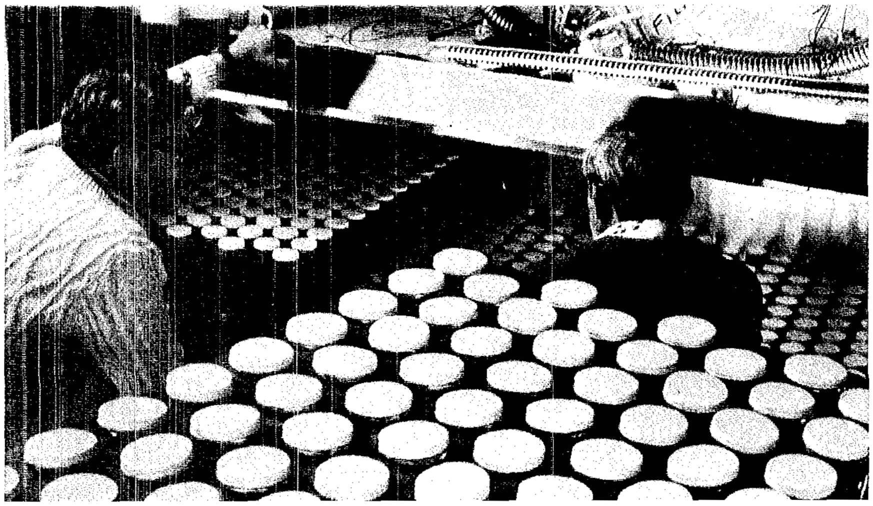
"We're excited because 500,000 mobile and modular homes are sold each year in the United States," Ken Herr, Q-24 alternate group leader, says. "If one can come up with a reasonably priced module, there's a good chance of solar heating making an impact on our economy in a fairly short time. That's what it's all about—introducing solar heating into the economy as soon as possible."

Unlike Henry Ford's first car, which was available in any color as long as it was black, modular and mobile homes fitted with the systems will be available in an almost unlimited variety of floor plans and styles.

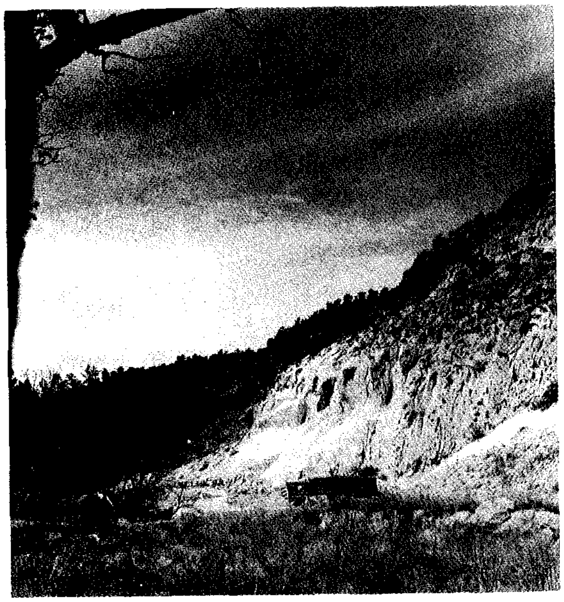
Balcomb and Herr believe that the appearance of the modular home will be extremely important in determining how well the system is accepted by the buying public. If the favorable reactions of the many people who have stopped by TA-46 to view the first module are any indication, the 2 men need have little concern.

Larry Hupke, Q-23, Ken Herr, and Doug Balcomb, both Q-24, review utility hookup plans for the solar module now "at home" at TA-46. Below, Lee Dalton, E-4, Hupke, and Ed Williams, Q-23, install equipment in the module's control center. At bottom, Stan Moore, Q-24, and Hupke arrange 1-pint water jars used to store solar-generated heat in racks under the control center.





# short subjects



Honors: **Carson Mark,** consultant and formerly T-Division leader, has been appointed to the Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards (ACRS). The ACRS advises the Commission on proposed and existing nuclear facilities and on safety standards.

**Fred Dorr,** previously C-Division alternate leader, has been named C-Division leader. He received his B.S. in mathematics from the California Institute of Technology in 1964, and his M.S. in 1965 and Ph.D. in 1969, both from the University of Wisconsin. Dorr succeeds **W. Jack Worlton** who will become associate division leader. **Norman Morse,** previously Group C-4 alternate leader, has been named alternate division leader.

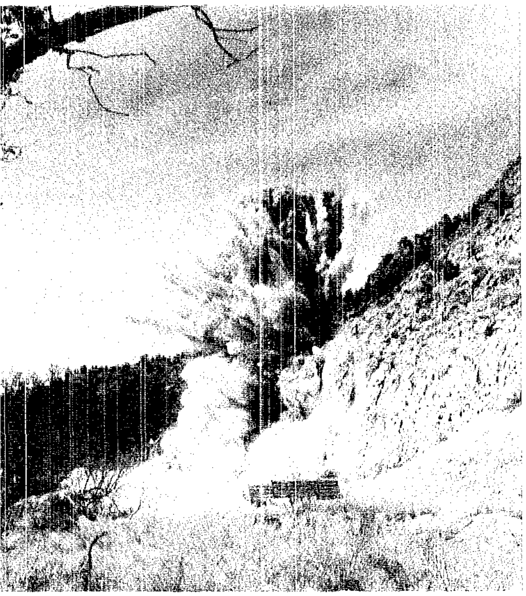
The Clinton P. Anderson Los Alamos Meson Physics Facility (LAMPF) is resuming full operation. On March 17, an 800-MeV proton beam was delivered to the main experimental hall and a checkout of meson beams began, representing the first beam used in the meson area in more than a year. A full research schedule begins in April. The main beam current will be raised from 10 microamperes to 100 microamperes during the next 6 months.

Group H-1 (health physics) held its first "Los Alamos Short Course in Radiation Safety" March 17-19 in the Physics Building auditorium. Continuations of the course will be held at the same site June 16-18 and September 15-17. The objective is to provide radiation workers with a basic understanding of radiation and the methods used for protection.

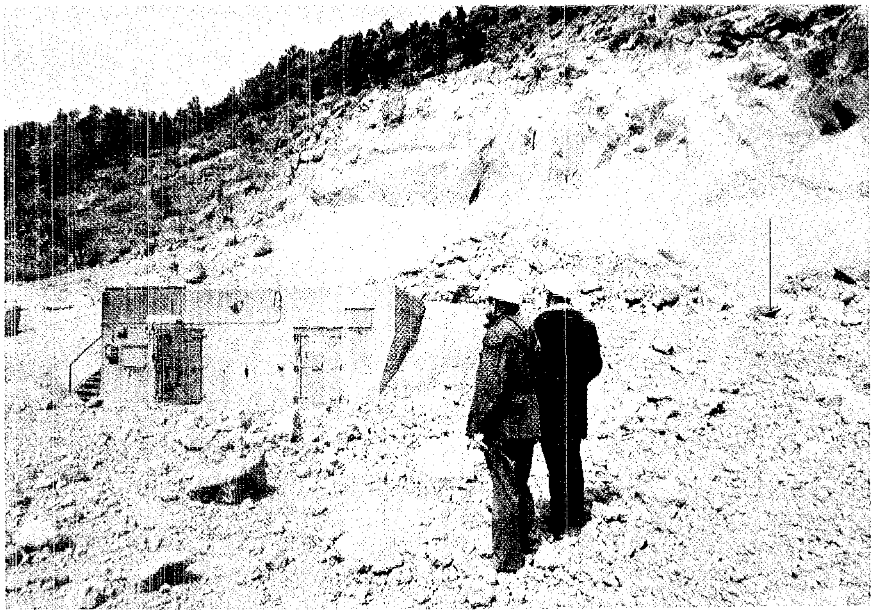
Retirements: **Earl Henry,** SD-1, laboratory machinist; **Benjamin Rogers, Jr.,** Q-24, staff member; **Bessie Sanders,** E-1, administrative specialist; **Robert M. Montoya,** WX-3, disposal technician; **Gordon L. Brown,** SD-2, records supervisor; **Dorothy Minor,** ISD-7, printer; **Clark Sanders,** truckdriver foreman; **Helen Burke,** PER-1, clerk.

On March 17, Harold Agnew, Director, presented a plaque to Group CMB-11 (plutonium chemistry and metallurgy) for oustanding safety, here being accepted on behalf of the group by William Maraman, group leader. No disabling accidents occurred in 1.6 million manhours of work from 1968 through 1975. Maraman attributes the group's achievement largely to "a high level of safety consciousness by every member of the group." The award was made in the recently completed TA-55 auditorium at the new plutonium facility on Pajarito Road.

# Photo Shorts



Over the years, explosive experiments conducted by Group M-6 at Ancho Canyon had weakened a portion of the canyon walls. As a safety measure, it was decided to blast the weakened walls down deliberately rather than wait until they fell accidentally, perhaps causing injury or damage. On February 26, the Zia Company and the Bud Walter Company of Albuquerque placed charges in the wall. Little happened as the spongy tuffa soaked up energy. Following test shots during the days following, the wall was successfully blasted on March 6. The photo at bottom right shows Don Cameron, ENG-4, and Swede Lindstrom, the Zia Company, surveying effects on a fence and bunker.



Reporter Barb Mulkin, ISD-1, went to Group H-2 offices for a story interview, instead found herself talking to a computer that talks back. Physician Bill Oakes, H-2, explains that such conversations are a new and important part of physical examinations all LASL employees will sooner or later take.

# Talking Health With a Computer

by Barb Mulkin

*Hello! I am going to ask you questions here to gain your family and your own health history for the occupational medicine physicians. The information you give will be used during a confidential interview with one of our health professionals. To answer a question, merely, 1) push the number on the keyboard which is next to your answer, 2) push the "return" key.*

Thus began an hour-long dialogue that I recently had with a computer as part of a revised, vastly expanded, and highly automated physical examination given by the Occupational Medicine Group (H-2) physicians.

It is the same conversation you, as an employee of the Los Alamos Scientific Laboratory, Energy Research and Development Administration, or Zia Company, will have in coming months when all employees of the 3 organizations are enrolled in the new health care system at the Laboratory.

My experience will give you a preview of what you can expect when you are called by Group H-2 to have a periodic exam.

It all began when *The Atom* heard about the new physicals and asked for a story. I called Bill Oakes, the H-2 physician in charge of LASL and Zia new-hire physicals, and I also talked with Bob Grier, H-2 group leader. I hadn't bargained for a complete physical, but agreed to one when Grier pointed out, "It would be a lot easier to describe what we are doing if you were to go through a typical sequence—you're about due for an update anyway."

But first, I had some pertinent questions that needed answers. What does the new examination consist of? What advantages would the new system have over the old one? Why was the new system developed?

The answers came quickly. The new examination had 9 distinct parts: A complete history taken by computer terminal, an actual physical examination by an H-2 physician, basic blood tests and a urinalysis, a complete chemical profile, an electrocardiogram, an audiogram (hearing test), an eye test, a respiratory check, and chest x-rays. In addition, women employees will be offered a Pap smear test (for early detection of cervical cancer).

The system, Grier told me, was developed to change the concept of occupational medicine from "treating emergencies and the common cold" to an all-inclusive system of preventive medicine. It was initiated as part of a national trend toward comprehensive employee health care. Automation in the system will speed up both new-hire and termination physicals, and make it possible for Group H-2 to comply with ERDA requirements for a checkup every year for those over 45, and an examination every other year for those under 45. In addition, Group H-2 will soon be able to complete 30 to 35 complete physicals a day, in contrast to the 18 physicals that can be given using current "manual" methods.

Use of computers will provide more time for the physicians to concentrate on problem areas and will reduce paperwork. It will also provide a highly confidential and current record of each employee's health.

As Grier put it: "We cannot change heredity, which governs many things, but with this kind of comprehensive record we can cover the total health profile and, by establishing parameters, we can assess physiological changes as they occur."

As I toured Group H-2 with Oakes, it became obvious why the group was anxiously anticipating its move in June into a new 9,000-square-foot office and laboratory complex of modular buildings being installed north of the main Shops building.

In addition to Oakes and Grier, two other staff physicians, Paul Flynn, alternate group leader, and Charles Shafer, share the present cramped quarters in the Administration Building. Group H-2 also has 6 full-time and 4 part-time registered nurses (3 of whom operate dispensaries at selected Laboratory sites), 2 x-ray and 2 laboratory technicians, an office staff of 4, and a full-time electronics engineer, Guy Hogle.

Hogle makes Group H-2 different from most industrial medicine groups, for he has designed a system that, when fully operative, will set standards that few, if any, larger institutions will be able to match.

An Air Force veteran who used his training as a bioengineer to design a computerized health system for the Armed Forces Examining and Entrance Stations before coming to LASL, Hogle began programming the new system last summer.

"Basic information on each employee was fed into a System 2000 Data Base at the Central Computing Facility," he explained. "From this data bank we are now able to pull names and records of those who are due for a physical."

Appointments are made for a two-day examination that will add to the information elicited by the computer interview.

"When the physician sees the employee, he will have read a capsule history provided by the computer," Hogle said. "The history will be current, but it will have cost the physician no valuable interviewing time. He will be free to concentrate on specific areas of concern."

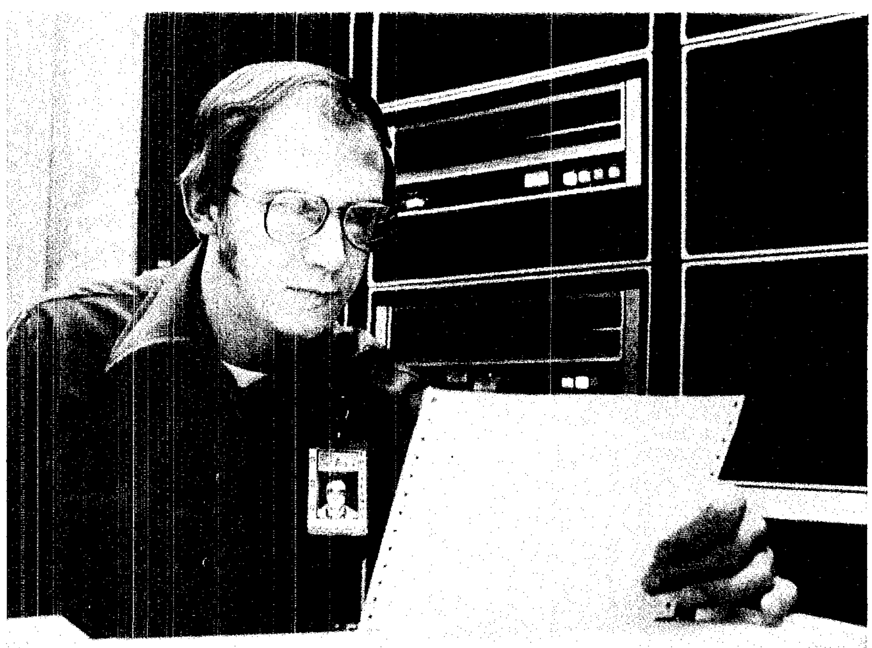
Hogle suggested I begin my exam with chest x-rays, and promised to get the PDP-11 computer ready for an interview later that morning.

Group H-2 x-ray technician Josefita Gonzales took front and right lateral pictures of my chest, and explained that the pictures would be read by a consulting radiologist at the Los Alamos Medical Center and that I would be called if there were any problem.

Next came an audiogram, given at the CMR Building by Esther Bottom, H-2. My hearing was checked in the normal conversational range of from 500 to 3000 cycles per second, and beyond.

Returning to H-2, I next took a

**Guy Hogle, electronics engineer with Group H-2, takes a narrative history from a line printer as a PDP-11 computer produces a detailed patient history for an attending physician.**



With a flip of a switch, Head Nurse Ernestine Farrar, H-2, connects patient Dennis Vasilik, M-1, to a computer in Chicago. In 60 seconds, the computer returns an extensive heart diagnosis.

Up to 24 sets of blood tests per day can be run with new equipment, here being operated by Joe Tafoya and Patricia Sprague, both H-2. The rate is double that which can be accomplished by previous methods.

pulmonary test designed to measure my ability to exhale (evidence of emphysema can be picked up early with this test). I had 90 per cent capacity—the score was good.

An electrocardiogram was scheduled. Head Nurse Ernestine Farrar, H-2, explained the function of the new EKG equipment as she attached electrodes to both arms and legs and to the right side of the rib cage.

"We use a digital system to transmit to a computer in Chicago your age, sex, build, and the names of any drugs you are using," she said. After dialing a toll-free number, she heard a tone and flipped a switch. The machine began tracing my pulse. In 60 seconds, even before she could remove all of the electrodes, a teletype in the next room chattily began printing a diagnosis of my heart: *TELEMED EKG ANALYSIS – Tachycardia (fast pulse – rate 116) Within Normal Limits.* The computer also noted that my EKG would be kept on file for 18 months for reference.

A visit to the laboratory came next. Joe Tafoya, H-2, talked about the new equipment he and technologist Patricia Sprague are using to run red and white blood-cell counts and to read hemoglobin levels. Much of the tedious, manual work associated with counting cells with a microscope has been eliminated with the installation of a hemoglobinometer (to measure hemoglobin levels) and a high-speed electronic particle counter for cells. Tafoya claims the equipment has made it possible for 2 technicians to more than double the rate at which samples can be read. "We can do up to 24 complete sets of these tests a day," he said.

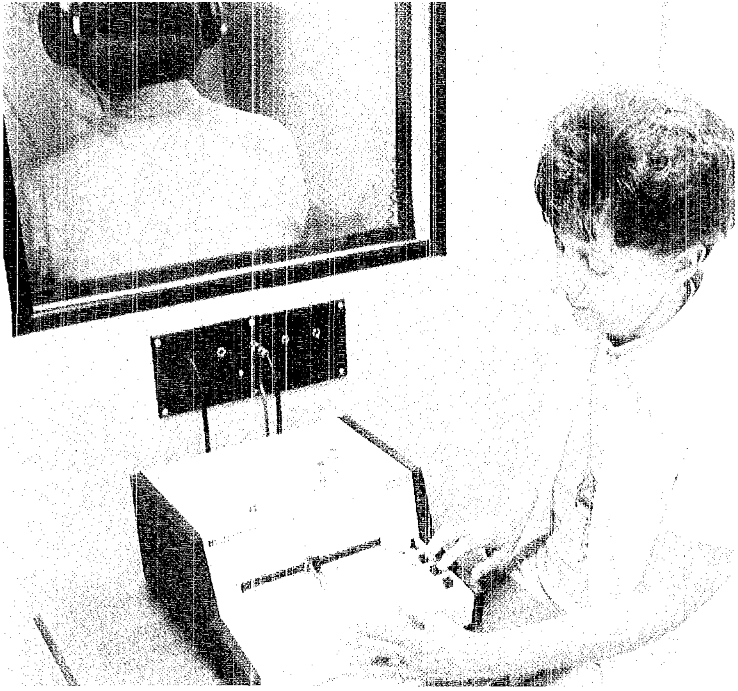
A complete chemical profile is obtained by sending samples to a California company, Tafoya said. Two dozen tests are routinely ordered for each sample. If a problem is indicated when the results are returned to Tafoya, an H-2 physician contacts the employee and followup tests are scheduled.

Blood work finished, I went back to Hogle's lab. Here, a computer terminal (1 of 2 now in use—4 more are on order) was waiting. Hogle began by explaining that as I was being interviewed by the computer it could simultaneously produce 16 labels on a line printer in the next room. Designed to be attached to my record and to each test that was performed, each label has my name and the "Z number" from my security badge. This information is centered on most labels, but the machine obligingly prints a few offset to the right of the label to facilitate wrapping the identifying tag around vials of blood.

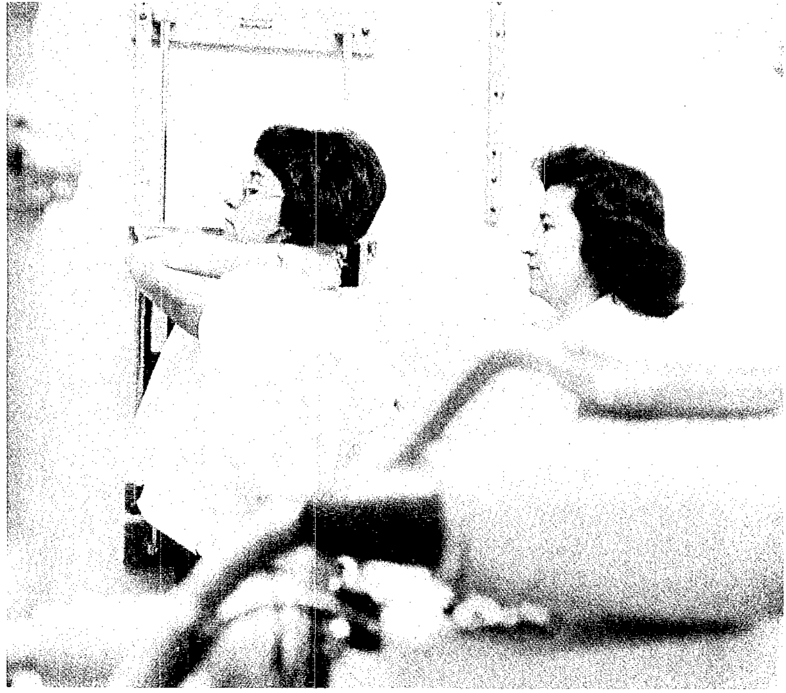
In preparation for the interview, the computer had been given my "name, rank, and serial number," as Hogle said. He waited until the machine had greeted me with, *hello!* then he left the room to give me privacy.

The PDP-11 got down to business and began compiling a family profile through a series of multiple-choice questions.

Although the entire questionnaire, which was adapted by H-2 physicians from an established sample obtained from the University of Wisconsin, consists of 430 questions, not all of them are asked of any one patient. The machine, I learned later, is programmed to ask some questions of everybody,



Registered nurse Esther Bottom, H-2, administers an audiogram (hearing test) to Dale Spall, CMB-1, in temporary quarters in the CMR Building. A soundproof booth is used for such tests.



Chest x-rays are a routine part of physicals given by Group H-2. Here, Josefita Gonzales, H-2, takes an x-ray of Cheryl Romero, H-1. A consulting radiologist later inspects x-rays.

but it asks different sets of questions depending on the sex of the patient and on the vital statistics that were given to it initially. In addition, it soon become obvious that the answer I gave to one question decided which question the computer would ask next.

For instance, if I had admitted to having a chronic or persistent cough, a further series of "cough" questions would be waiting in the wings. Having denied that I had a cough problem, the PDP-11 went on to the next question.

Hogle had said a patient usually finished the questionnaire in about 45 minutes, answering an average of from 350 to 375 questions, unless there is a "glitch" in the program. When this happens, as I learned, a battle of wills can ensue and the interview is lengthened.

The honor of discovering the first glitch in the history of the new program belongs to me.

*Has your mother had any of the following? (Multiple Choice)* appeared in bright blue letters on the terminal screen, followed by:

*R 1: Anemia*
*R 2: Arthritis*
*R 3: Asthma*
*R 4: Difficulty stopping bleeding*
*R 5: Diabetes*
*R 6: Epilepsy or Convulsions*
*R 7: Glaucoma*
*R 8: Heart Disease*
*R 9: None of the Above or Don't Know*

Having just finished an identical set of questions about my father, I confidently pushed number 9 and the return key. Instead of going on, the computer began again: *Has your mother had any of the following? (Multiple Choice).* Startled, I punched number 9 and the return key. Peevishly, the machine responded: *Has your mother. . .*

Five times we clashed. Five times the computer won, stubbornly trying to get a different answer. In desperation I yelled for Hogle. He came, looked, and pleaded with his electronic partner through a series of rapidly typed instructions. Momentarily, it hesitated, but then it relented and, with a show of reluctance, began to print the next question. Hogle commented that only 150 employees had taken the new physical so far, and "this is the first bug we have found in the system."

The electronic interview was not "all business," I found. At one point, the computer relaxed enough to give me a brief homily on the perils of cigarette smoking and a "pat on the back" for mentioning that I had tried to quit.

Having elicited the fact that I had been known to smoke up to a pack of cigarettes a day, the computer solemnly digressed to warn me: *There is much evidence to show that smoking is bad for your health.*

Finding that I had tried to stop, the machine burbled: *Oh, good for you! About how long ago did you quit?* Then it asked me to indicate the number of years by typing a number from the keys.

Having drawn a complete profile of my family and of my social history and having progressed to the documentation of my health, the computer veered from purely clinical probing to a solicitation of mental and emotional responses. It asked me questions about stuttering and tried to find out if I had phobias about snakes, high places, and water.

With possible job-associated

**Registered nurse Mary Jane Trujillo, H-2, checks the ears of Danny Valdez, E-2. Examination of the ears is a routine procedure for employees coming to Group H-2 offices on "sick calls."**

problems disposed of, the machine asked me about any trips I had taken to foreign countries, especially those to the tropics. Here the machine took time out to encourage me: *You certainly are doing fine!* It paused, got back to business, and inquired about typhoid fever, cholera, chorea, (a nervous disorder), and rheumatic fever before moving on to explore my allergies.

I was glad I wasn't a patent-medicine "freak" by the time the computer finished that segment of questions. Because I use no aspirin and very little other medication, I had the joy of seeing the machine comment: *You certainly are stoic! Well, it certainly is good not to take medicine when you do not have to.*

More Brownie points came my way when I confided I had had a Pap smear in the past year. The PDP-11 almost raved: *Oh, good for you! A yearly Pap smear can detect cancer in time for effective treatment.*

By the time the computer wrapped up the question-and-answer series with one last pat on the back *(This completes the history. You have done very well!),* I was inclined to have complete confidence in Hogle's machine, and was almost childishly grateful for its frequent words of praise.

"What happens next?" I asked Hogle.

"The machine will produce a narrative personal history for you. It will be a concise report detailing your health, heredity, habits, and areas of concern. When you come back to meet one of our physicians, he will have read the history and will know exactly what areas he feels he needs to check."

Hogle went on to say, "If you remain at LASL, you should be called for an interview a year from now, and anything that has changed in your history will be fed into the computer. So, your report has been updated for the examining physician.

Oakes confirmed this when I met him next day.

"The automation does not mean a patient is just left with a machine," he was careful to point out. "It means the computer can spend an hour with an employee and get much more information in much less time than I could in an old-fashioned interview. This gives me more time to look at those things that really merit attention. For a physician, it amounts to giving a physical in half the time by pushing a dozen buttons."

By June, when Group H-2 moves into its new quarters, the count of employees "plugged" into the new system will accelerate rapidly, for equipment that will further speed the compilation of computerized health records will be in use then.

Grier says a "mark sense reader," a machine he describes as "a twin to the machine that processes your order for hamburgers at McDonald's" should be received in the near future. Data from the physical tests performed in-house will be marked on a preprinted form by a nurse or technician. The machine will "read" the data, which will then be added to the patient's computer history. A high-speed line printer will replace the machine currently in use for producing schedules for physicals and the narrative histories that are stored in a memory bank.

Also scheduled, according to Oakes, is an extension of the new system to include computer-diagnosed x-rays, computer-diagnosed "stress-test" electrocardiograms for selected patients, and a more automated approach to the regular eye examinations given to those who work with lasers.

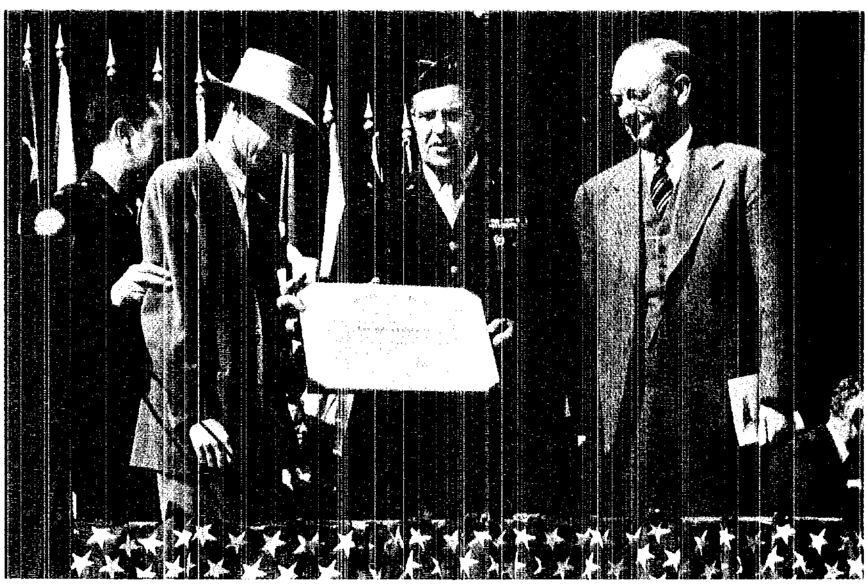
The physical completed, Oakes escorted me back to Hogle's lab. Hogle was waiting for the machine to produce my narrative history so that I could have a copy for a souvenir. The machine was chattering rapidly: *IDENTIFICATION DATA—name—age—sex—Z number—SOCIAL HISTORY . . . FAMILY HISTORY . . .* Sure enough, it stopped momentarily when it came to *mother.* The 3 of us held our breath. The computer relented, and resumed. I hadn't threatened it, but I had thought about it. I wonder if Hogle had programmed it for mental telepathy?

# 10, 15, 20, 25, 30 Years ago in Los Alamos


At the end of 1975, 463 Laboratory employees had earned pins for 10, 15, 20, 25, or 30 years of service. Harold Agnew, Director, awarded service pins to recipients who attended ceremonies in the Administration Building auditorium on January 28 and 29. The Laboratory further recognizes the recipients by publication of their names in this article.

Last year, *The Atom*, departing from its custom of merely listing the names of recipients, added historical notes about the years when most of the recipients became Los Alamos Scientific Laboratory employees. The idea was well received. Many service-pin recipients said they appreciated having some vivid memories recalled; others said they enjoyed reading the synopses of Laboratory history.

This year, *The Atom* persuaded Bob Porton, ISD-2 group leader, to write the historical highlights. Porton came to Los Alamos in 1944 as a U.S. Army combat engineer, was manager of radio station KRS (now KRSN), Los Alamos, from 1946 to 1956, and is an originator of the Norris E. Bradbury Science Hall and Museum. A Los Alamos-history buff, Porton is the author of the popular "10 Years Ago" column which, except for this issue, appears regularly in *The Atom*.



J. Robert Oppenheimer, Laboratory Director; Leslie Groves, major-general, U.S. Army; and Robert Sproul, president of the University of California, are principals during "E"-award presentation at Los Alamos in 1945.

## *1945*

This was the year when "Mission Impossible" became "Mission Accomplished!"

In 1945, the combined efforts of civilian and military personnel were climaxed by the Trinity detonation, the drops on Japan, and the end of World War II. The "Los Alamos secret" was revealed by President Harry S Truman. Laboratory Director J. Robert Oppenheimer resigned and was succeeded by Norris E. Bradbury. Meeting with key staff members in October, Bradbury laid his cards on the table. He was convinced that the nation would need a laboratory for research in military applications of nuclear energy and that Los Alamos, now one of the world's best-equipped research laboratories, was the logical candidate for the job. "While waiting for hoped-for legislation, we should set up the most nearly ideal project to study the use of nuclear energy," he stated. The construction of a peacetime laboratory had begun.

This was the year during which the Los Alamos Post Office was established and, for the first time, mail came directly to The Hill. And this was the year when the water-supply line to Los Alamos froze. Water for those people who stayed was trucked in. Every tank truck for hundreds of miles around was "drafted" for hauling water to the town site, and it was estimated that it cost 25¢ to flush a toilet. When the water lines began operating again, things got better, including morale.

The Laboratory received a certificate from Henry L. Stimson, Secretary of War. It read "For valuable services rendered to the Nation on work essential to the production of the atomic bomb, thereby contributing materially to the successful conclusion of World War II." Among those sharing in the honor were many of those listed below, all of whom recently received their 30-year service pins:

*Brooks, Melvin, WX-DO*
*Buckland, Carl W., Jr., H-1*
*Campbell, Arthur W., M-3*
*Carlson, Bengt G., T-1*
*Carr, Leo J., H-10*
*Dabney, Winston L., AO-5*
*Duhamel, Harry F., SD-5*
*Dunahugh, Beatrice, PER-DO*
*Hall, David B., R-DO*
*Hemmendinger, Arthur, P-3*
*Huber, Elmer J., Jr., CNC-3*
*Johnstone, Stanley G., SD-5*
*Mirabal, Mary S., WX-7*
*Russ, Harlow W., WX-1*
*Sandoval, Ruben J., WX-2*
*Starner, John W., P-2*
*Vier, Dwayne T., CMB-3*
*Vonderheide, Elmer J., SD-5*
*Watts, Donald, SP-4*
*Westcott, Roger J., Q-DO*
*Yaeger, Joseph D., SD-1*

# 1950

In 1950, Atomic Energy Commission (AEC) and Zia Company officials worked on a solution to a serious problem—a threatened shortage of electricity. "Should a major power failure come, due to overload, the Laboratory would not be affected," said Elmo Morgan, project manager for the Zia Company. Electrical circuits were arranged so that residential areas would be the first to lose power should the load become too great. The Zia Company began a campaign to conserve power in the Atomic City, printing posters and issuing public warnings against overloading circuits.

**The Los Alamos Canyon bridge nears completion in this 1950 photo. The bridge made possible the rapid and extensive development of present-day Laboratory facilities on South Mesa.**

A major project to put Los Alamos on a permanent basis was the beginning of the construction of a $10 million to $12 million laboratory and administration building. The overall plan for Los Alamos included replacement of all Army-type temporary buildings over a 5-year period, and a modern housing development for the Los Alamos residential area. To reach the new Administration Building, construction was started on a 3-lane bridge across Los Alamos Canyon from the community to the new site on South Mesa.

During 1950, transfer of the Los Alamos and White Rock schools from the AEC to the Los Alamos County Board of Education was completed with the signing of an agreement concerning maintenance and operation. It covered such phases as the Commission's continuing contribution of funds, use of the physical plant for nonschool purposes, and operation of the civic auditorium, gymnasium, and community swimming pool. It recognized that the Board would have "complete freedom with respect to application of academic policies and procedures as prescribed by the State of New Mexico."

A policy to control the Hill's uncounted home businesses was under study by the AEC. In addition to the concessions conducted in government-allotted commercial space, Los Alamos had numerous small enterprises operating in private homes. Three home businesses had commercial phones, but an additional 21 listed in the classified directory were apparently paying only private-party phone rates. The entrepreneurs offered services ranging from Mexican food to radio repairs.

The New Mexico state liquor director knocked down the last barrier to the establishment of a public cocktail lounge in Los Alamos. He approved a dispenser's license in Fuller Lodge. Previously, out-of-the-home drinking in Los Alamos had been confined to private clubs. Nonclub members on The Hill had been advocating for some time the establishment of a public facility.

Among those who suffered or enjoyed the changes that took place in 1950 were most of those listed below who recently received their 25-year service pins:

*Aiello, William P., E-3*
*Archuletta, Felix B., WX-3*
*Arnold, George P., L-3*
*Bailey, Milton G., M-1*
*Barylski, Frank, SD-5*
*Battat, Morris E., T-1*
*Beaty, Ruth B., DIR-O*
*Bernard, William, R-5*
*Berry, Francis G., ISD-7*
*Bjorklund, Carl W., CMB-11*
*Boyer, Keith, L-DO*
*Bunker, Merle E., P-2*
*Campbell, Ethel, SP-DO*

*Catanach, Eduardo, WX-3*
*Chambers, William H., R-2*
*Chiles, William C., M-3*
*Cole, Margaret L., ENG-DO*
*Cunningham, Joseph D., SD-5*
*Cunnington, Eugene W., ENG-8*
*Dare, Francis V., WX-3*
*Day, Roderick S., CMB-11*
*Deal, William E., Jr., M-DO*
*Delgado, Manuel C., M-6*
*Devaney, Joseph J., L-5*
*Dinegar, Robert H., WX-7*
*Dodder, Donald C., T-9*
*Elmore, Lawrence M., WX-7*
*Faudree, Robert E., M-4*
*Fernandez, Alfredo B., H-1*
*Geoffrion, Louis A., H-5T*
*Gibson, Lloyd H., SD-5*
*Goad, Walter B., Jr., T-10*
*Gould, Edward G., WX-3*
*Grenfell, Richard B., ENG-9*
*Hansen, Gordon E., R-5*
*Harper, Paul, C-3*
*Headdy, Winfred L., ISD-7*
*Heimbach, Pauline E., SP-2*
*Henderson, Clarence, H-DO*
*Henkel, Richard L., P-9*
*Hidy, Harold A., ENG-1*
*Hiebert, Richard D., E-3*
*Hoverson, Bruce E., WX-1*
*Humbyrd, Alvin E., WX-3*
*Justus, Arthur J., WX-3*
*Kavanaugh, Henry J., CMB-1*
*Keller, William H., Q-26*
*Kelley, Doris E., CMB-AP*
*Kelley, William J., SD-5*
*Kerr, Eugene C., Q-26*
*Kleczka, Peter F., SD-1*
*Knobeloch, Gordon W., CNC-1*
*Lamkin, Eugene, L-4*
*LaPlant, Ellen, WSD*
*Leland, Wallace T., L-1*
*Little, Edward M., CTR-7*
*Livingston, Robert W., SD-5*
*Lopez, Albert G., M-6*
*Lucero, Luis A., WX-3*
*Lucero, Mariano, WX-3*
*McCall, William M., ENG-14*
*McInteer, Berthus B., CNC-4*
*McQueen, John H., J-DOT*
*Maes, Carl T., WX-3*
*Maestas, Antonio F., WX-3*
*Malik, John S., J-DOT*
*Mann, Joseph B., Jr., T-4*
*Martinez, Aniseto, SP-3*
*Martinez, Benjamin O., WX-3*
*Martinez, Delfino, WX-3*
*Martinez, Felipe T., J-2*
*Mills, Robert L., Q-26*
*Montano, John L., SP-3*
*Montoya, Frank M., CMB-6*
*Montoya, Robert M., WX-3*
*Moore, Phillip F., CNC-11*
*Mulford, Robert N., CMB-5*
*Naranjo, Albert, SD-1*
*Nash, Douglas E., SD-1*
*Nichols, Joe R., CMB-11*
*Onstott, Edward T., CMB-8*
*Peck, Robert C., L-4*
*Peek, Harry M., J-10*
*Pena, Bennie, A-5*
*Price, George S., WX-DO*
*Quackenbush, Arthur D., SD-5*
*Richardson, James H., MP-1*
*Riechman, Norman H., SP-2*
*Roberts, Samuel L., SD-5*
*Romero, Acorcinio O., WX-3*
*Rutledge, Earl R., TD-7*
*Salazar, Nicolas L., CTR-2*
*Salmi, Ernest W., ADWP-2*
*Schulte, Stephen B., CMB-6*
*Scott, William A., SD-5*
*Shaw, Everett E., J-7*
*Stein, Paul R., T-7*
*Stewart, Leona, T-2*
*Stivers, Eugene L., E-2*
*Sturgess, Lorene L., WX-5*
*Sullivan, William H., SD-4*
*Van Etten, Edward J., WX-3*
*Venable, Douglas, M-DO*
*Vigil, Robert, CMB-6*
*Waterbury, Glen R., CMB-1*
*White, George N., Jr., TD-DO*
*Williamson, Thomas B., WX-3*
*Wood, William W., T-DOT*
*Zinkowski, Raymond, ENG-4*

# 1955

The "talk of the town" in 1955 concerned the possibility of the sale of government-owned houses in Los Alamos to the public under a program similar to those that had been proposed for Richland, Washington, and Oak Ridge, Tennessee. A Congressional subcommittee held a public hearing in September. In response to a press inquiry as to the attitude of the Laboratory administration towards the proposal, Director Bradbury issued the following statement: "All questions concerning housing at Los Alamos must be viewed in the light of the basic reason for the existence of the Los Alamos Scientific Laboratory. The Laboratory has long been painfully aware that the inability of an individual to own his own home is a major cause of concern to residents and a major stated cause for termination."

This was the year of the "Big Move." Step by step, LASL began the relocation of many of its activities from TA-1, located in the town site, to TA-3, located on South Mesa.

In celebration of the completion of the major part of the move, the first Family Days were held by the Laboratory. The major purpose of this first open-house affair was to enable the families of employees to "see the place where Mommy and Daddy worked." Although the gates to the town were still up, a number of visitors from the outside were invited, including news media representatives, who were able to see LASL facilities for the first time. The affair was considered very successful by all those who attended.

This was the year that the first serious discussion took place in the Laboratory concerning the feasibility of Project Rover. The program was established, and work began on the Kiwi-reactor series. The reactor was named after the flightless bird of New Zealand. Project Rover's purpose was the application of nuclear energy for propelling deep-space rockets.

New hires who joined the Los Alamos Scientific Laboratory in 1955 included most of the personnel listed below, who were awarded 20-year service pins:

*Aguilar, Martin, ISD-5*
*Albertson, Robert D., PER-1*
*Apel, Charles T., CMB-1*
*Arnold, Donna M., SP-12*
*Baca, Dan, ISD-4*
*Baker, Herman P., ENG-2*
*Baldridge, Loretta M., WX-1*
*Biggs, Alfred G., WX-5*
*Bjarke, George O., E-1*
*Blevins, David J., Q-23*
*Boicourt, Grenfell P., CTR-4*
*Browne, Charles I., DIR-O*
*Brownlee, Robert R., J-DO*
*Brundige, Edward L., CMB-11*
*Buettner, Leonard, M-4*
*Caldwell, Charles W., M-6*
*Campbell, Patrick, Jr., WX-3*
*Christenson, Conard, H-7*
*Clark, Ruth L., SP-12*
*Coffin, Don O., WX-5*

*David, Walter R., CMB-3*
*Demuth, Howard B., C-8*
*Dugan, Paul M., WX-1*
*Elliot, Donald E., ENG-2*
*Engelke, Morris J., Sr., H-1*
*Foglesong, Mildred K., Q-DO*
*Geer, William U., DIR-FMO*
*Green, Clara L., WX-7*
*Guevara, Francisco A., H-1*
*Hagerman, Donald C., MP-DO*
*Hillhouse, Nancy, SP-DO*
*Johnson, Carl, Jr., J-DO*
*Johnson, George L., H-7*
*Johnson, William G., ISD-3*
*Kernodle, Norman K., WX-3*
*Knapp, Edward A., MP-3*
*Koelle, Alfred R., E-3*
*Labauve, Raphael J., T-2*
*Livermore, Glen H., L-1*
*Lockett, Andrew M., III, T-6*
*Loughran, Edward D., WX-2*
*McCallister, Mary G., WX-3*
*Mader, Charles L., T-4*
*Martinez, Cornelio G., H-7*
*Martinez, Presciliano, ISD-5*
*Martinez, Venancio, J-16*
*Masanz, Paul J., WX-3*
*Mench, Vera L., WX-3*
*Montoya, Carmen R., J-6*
*Moore, Dolores B., C-1*
*Nagle, Darragh E., MP-DO*
*Newman, Herbert J., L-6*
*Olsen, Clayton E., J-5*
*Ortiz, Cayetano R., H-1*
*Plassmann, Eugene A., R-5*
*Reiswig, Robert D., CMB-8*
*Reitmann, Richard H., J-6*
*Rice, Laurence L., J-6*
*Roach, Alita M., M-DO*
*Rodriguez, Emilio, M-6*
*Rohr, Dana L., CMB-5*
*Romero, Jose O., WX-7*
*Rouse, Prince E., Jr., WX-2*
*Roush, Robert E., J-6*
*Salazar, Freddie, E-1*
*Schmidt, Herta A., C-1*
*Spack, William, Jr., C-DO*
*Stephens, Vernon J., ENG-DO*
*Stone, Walter A., CMB-7*
*Stratton, Thomas F., L-1*
*Thieme, Melvin T., TD-4*
*Thomas, Edgar A., E-2*
*Thompson, Helen L., WX-7*
*Turner, Almera L., ISD-6*
*Usner, Arthur A., L-1*
*Valdez, Jose P., H-7*
*Vigil, Joe A., H-1*
*Walker, Robert W., CMB-11*
*Westervelt, Donald R., J-14*
*Wittman, Frederick E., CTR-1*

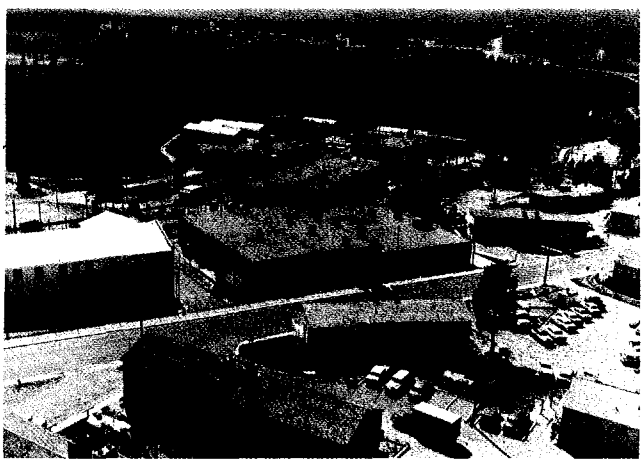
# *1960*

One of the main topics of discussion in 1960 dealt with the continuing housing shortage. Many Laboratory new hires found that they had to house-hunt in Santa Fe, Espanola, and other communities. The number of employees on Laboratory waiting lists was far greater than the number of rental units. More and more emphasis was being placed on development of White Rock to provide several hundred single-family homes for rent or sale to LASL employees.

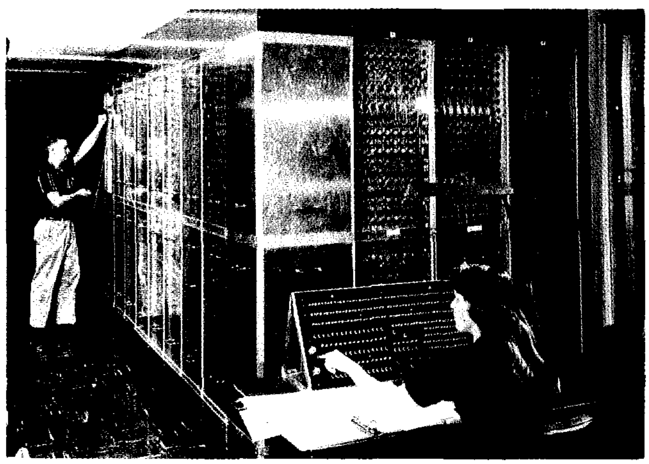
Frank DiLuzio, deputy manager of the AEC Albuquerque Operations Office, called together some 40 representatives of 17 of the State's leading lending agencies to discuss problems Los Alamos people were encountering in obtaining loans to build homes. He told the financiers that Los Alamos is here to stay. "Most investment people in New Mexico have demonstrated a reluctance to invest in Los Alamos because they have the mistaken idea that Los Alamos is temporary and will be abandoned once a weapon-test moratorium is set," DiLuzio said. "LASL is a basic research center and will be playing a major role in things to come."

In 1960, the Los Alamos Police Department moved from an old wartime structure to its new headquarters on Trinity Drive, which was the former Zia Company gas station and dispatch office. The new building was remodelled to add prefabricated cages as jail cells on the first floor, upstairs quarters for the detention of women and juveniles, fencing for an outside recreation area for prisoners, and office space to provide privacy for people with police business.

In 1959, the Laboratory had bugs in one of its reactors. In 1960, it was mice in the MANIAC. A mouse



The "Big Move" from Townsite (foreground) across Los Alamos Canyon to TA-3 (background) began in 1955. All foreground buildings shown here have since been removed.



In 1960, a mouse put the Maniac II computer temporarily out of business. Wags added "mouse-trapping" to the computer's capabilities. Maniac II was the ultimate computer of the times.

stepped across a 1500-volt bus bar in the computer and gave up its tiny ghost in a flash. The computer operators gave the critter a decent burial, replaced half a dozen resistors, and got the million-dollar machine back in business. Then they put up a sign that read: *BEST MOUSE TRAP WEST OF THE MISSISSIPPI (patent applied for).*

And 1960 was the year during which many of these 15-year veterans joined the Los Alamos Scientific Laboratory:

*Alire, Richard M., CMB-3*
*Anderson, Charles A., A-DOT*
*Archuleta, Florence, H-1*
*Barela, Adolfo E., WX-5*
*Barnes, John L., SP-10*
*Barnes, Robert H., SD-5*
*Billings, R. Elizabeth, SP-11*
*Bird, Paul F., L-3*
*Blackburn, Rolland J., CMB-7*
*Blackstock, Albert W., H-1*
*Blair, Allen G., DIR-O*
*Boise, Otis W., ENG-4*
*Booth, Lawrence A., L-5*
*Borrego, Paul R., J-10*
*Bower, Jerald D., SD-1*
*Bradshaw, Robert, ENG-DO*
*Breisch, George, ENG-1*
*Brooks, Thomas S., CMB-5*
*Bruington, Helen M., CNC-11*
*Butler, Thomas D., T-3*
*Camp, Glen M., MP-7*
*Carpenter, Susan, H-4*
*Clayton, Richard D., P-11*
*Collier, Jimmy W., L-4*
*Conner, Allan J., ADW-PM*
*Courtright, W. Clarence, H-3*
*Daly, Bart J., T-3*
*Davis, Calvin H., SD-5*
*DeLay, George S., SD-1*
*Dill, Glen J., SD-1*
*Dudziak, Edward C., TD-6*
*Duran, Melvin G., J-10*
*Frank, Robert M., C-4*
*Fritz, Joseph, M-6*
*Fuller, Richard C., ENG-4*
*Gallegos, Andres, M-3*
*Garcia, Julio J., WX-3*
*Garn, Marjorie L., H-4*
*Geoffrion, Carmen G., TD-4*
*Geoffrion, Marie V., P-DO*
*Gritsko, Edward, SD-5*
*Hagan, Roland C., M-1*
*Hamilton, Charles W., TD-5*
*Hansen, Wilfred G., E-4*
*Hargenrater, Thomas V., WX-3*
*Harper, J. Donald, M-DO*
*Helmick, Sara B., CNC-11*
*Henderson, Michael G., TD-3*
*Hicks, Mildred V., ADWP-1*
*Humphreys, Kenneth G., M-3*
*Hyer, Ronald C., L-2*
*Ide, Harold M., H-5*
*Johnson, Donald R., SD-5*
*Karr, Mae F., P-2*
*Keddy, Edward S., Q-25*
*Kenner, Ernest, SD-1*
*Kerrisk, Jeremiah F., CMB-11*
*Kieren, George F., SD-5*
*King, Charles R., CTR-9*
*Kirby, Robert S., WX-5*
*Klebesadel, Ray W., P-4*
*Kostacopoulos, John, CMB-6*
*Lind, Gary W., SD-2*
*Lobb, Dorine G., SP-3*
*London, Roger E., M-2*
*Louck, James D., T-7*
*Lunsford, John L., CMB-8*
*McDowell, Robin S., CNC-4*
*McGuire, Austin D., DIR-O*
*McLeod, John, L-2*
*Maestas, Sixto, H-1*
*Manker, Lawrence F., Jr., CMB-6*
*Mariner, Mary L., L-DO*
*Markham, Jack R., L-6*
*Martinez, Elvira E., MP-1*
*Martinez, Rudolfo, CMB-11*
*Meier, Karl L., P-14*
*Munno, Edward J., SD-1*
*Mynaugh, Charles F., MP-2*
*Naranjo, Lee., WX-3*
*Neely, Glen W., H-1*
*Neergaard, James R., C-3*
*Netuschil, Jennie Rae, CMB-1*
*Neudecker, Joseph W., WX-8*
*Nichols, Billy D., T-3*
*Nichols, Norris A., TD-4*
*Novak, Jan K., MP-7*
*Pasicka, Donald F., SD-5*
*Phelps, Leah R., J-8*
*Poe, Bobby F., MP-11*
*Preciado, Ramon S., SD-1*
*Pruner, Robert E., CNC-11*
*Radosevich, Charles L., CMB-3*
*Reichelt, Walter H., L-1*
*Rivera, Oliver M., MP-3*
*Roybal, Dolores R., M-4*
*Royer, Katherene, PER-1*
*Sanchez, Herman E., WX-3*
*Sandford, Thomas A., WX-1*
*Sandoval, John, ISD-7*
*Schneider, Edward J., MP-11*
*Scott, Virgil W., SD-5*
*Serna, Orlando A., CMB-14*
*Sherwood, Arthur R., CTR-5*
*Sherwood, Boyd A., P-12*
*Taylor, Roger W., ADWP-1*
*Terry, Donald R., ENG-10*
*Thayer, Douglas R., J-14*
*Thurston, Rodney S., ADWP-2*
*Tolmie, Donald E., C-9*
*Trexler, Mary Joe, H-DO*
*Trujillo, Gilbert E., SP-4*
*Ulery, Lloyd H., WX-1*
*Valdez, David G., M-2*
*Valencia, Flavio A., CMB-3*
*Valerio, Jose F., SP-3*
*VanVleet, Myra M., CMB-14*
*Vigil, Ernesto A., H-4*
*Warner, Charles L., H-7*
*Warren, John L., CTR-DO*
*Wendroff, Burton B., T-7*
*Wheat, Lloyd D., H-5*
*Whitmore, Elmo J., J-7*
*William, Herbert T., P-2*
*Witte, Kathleen F., C-3*
*Witte, Maxwell G., WX-3*
*Worlton, Dale R., TD-4*
*Yandell, David, Jr., SD-5*
*Yusnukis, Donald J., SD-2*

# *1965*

A LASL-developed bit, which melts its way through solid rock, may be the answer for making holes in the earth to depths impossible by conventional drilling methods. The bit was the outgrowth of an academic discussion by members of Group CMF-4. Experimentally, a 2-inch diameter bit, heated electrically to 1,200 degrees Celsius, drilled through basalt at the rate of 50 feet per day.

Laboratory physicists achieved the highest particle energies ever obtained with electrostatic accelerators by hooking 3 Van de Graaff accelerators together in series. The new record of 25.4 million electron-volts was reached after only a few days of testing with the older vertical unit linked to the 2 units of the more recently installed Tandem Van de Graaff.

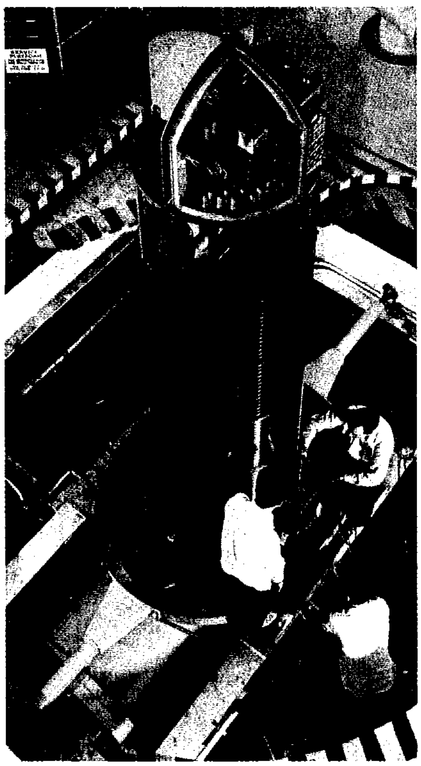
The Los Alamos Scientific Laboratory main library, one of the largest and most complete scientific reference libraries in the country, became a "public" library. The action was one of the Laboratory's moves to extend use of its facilities to other qualified researchers.

The Supply and Property Department, the Personnel Department, the Community Relations Office, and the LASL Science Museum all moved from the area near Ashley Pond to the new Administration Building annex, writing *finis* to all Laboratory operations in TA-1. The AEC authorized the removal of P-Prime Building, AP Building, and other structures in the old main technical area dating from the earliest days of the Laboratory.

More than 1 million dollars for architecture and engineering work on the Los Alamos Meson Physics Facility was released by the U. S. Bureau of the Budget. This action, according to the Office of U. S. Senator Clinton P. Anderson, vastly improved the Los Alamos Scientific Laboratory's prospects of building the particle accelerator.

An estimated 20,000 persons took advantage of lowered security barriers to flock to the Laboratory during Family Days. Some of the 10-year service-pin recipients who assisted in the hospitality for the occasion are among those listed below:

*Ahlquist, Alfred J., H-8*
*Andrae, Richard W., WX-8*
*Arnold, Deane W., WX-3*
*Arntzen, Edward G., ENG-2*
*Baker, Thomas D., CNC-11*
*Barrington, Helen L., H-9*
*Beatty, Jerry N., J-7*
*Blair, Larry S., L-3*
*Boicourt, Rose Mary, T-2*
*Bowman, Kenneth B., WX-4*
*Bowyer, Robert D., ENG-14*
*Bramlett, Richard D., CMB-6*
*Briesmeister, Margaret, P-DO*
*Briesmeister, Richard, CMB-3*
*Bryan, Lucy R., J-16*
*Buchholz, Jerry Ray, H-7*
*Burdette, Nancelie, E-DO*
*Butcher, Robert R., L-7*
*Butler, Gilbert W., CNC-11*
*Carney, Delmo D., CMB-7*
*Carter, William J., M-6*
*Catlin, Lloyd L., P-14*
*Chapman, Rosemary V., PER-1*
*Clayton, Ronald D., L-7*
*Comer, Bob E., ENG-2*
*Cosimi, Ronald E., J-7*
*Cuntz, Mary I., PER-4*
*Dauelsberg, Lawrence H., MP-12*
*Demny, Alexander J., SD-2*
*Drake, Darrell M., P-3*
*Durmaj, Richard L., ENG-2*
*Dye, Bobby A., CMB-11*
*Dyer, Charles R., ENG-2*
*Eden, Guy E., CTR-5*
*Eichor, James R., ENG-4*
*Ekberg, Betty M., ISD-2*
*Engel, Lars N., TD-2*
*Engelke, Beverly E., MP-13*
*Erickson, William C., CMB-6*
*Farrell, John A., P-11*
*Fehlau, Paul E., R-2*
*Findley, Clinton E., L-1*
*Fisher, Kay J., J-15*
*Fradkin, David B., L-6*
*Frantz, Charles E., Jr., CMB-5*
*Fraser, Eli O., CMB-8*
*Gage, June H., T-9*
*Gill, Danny G., SP-11*
*Gribble, Robert F., CTR-3*
*Hakkila, Peggy J., CMB-1*
*Halliday, Jack N., SP-DO*
*Hanks, Kenneth W., CTR-4*
*Hassman, Richard J., M-4*
*Hawkins, Eugene V., WX-6*
*Helfer, David E., MP-2*
*Helland, Marlice D., ENG-4*
*Hennigh, Charles M., CMB-AS*
*Henson, Robert M., TD-2*
*Hirt, Cyril W., Jr., T-3*
*Hones, Edward W., Jr., P-4*



In 1965, LASL's vertical Van de Graaff accelerator (a section of which is shown above) was linked to the new Tandem Van de Graaff to set a new record in particle energies: 25.4 million electron-volts.

*House, Jack W., J-9*
*Hutchinson, William B., CMB-1*
*Kearns, James P., M-2*
*Keaton, Posey W., Jr., E-DO*
*Keller, M. Dean, ENG-1*
*Kent, Richard A., CMB-11*
*Lark, Marjorie E., CNC-11*
*Larson, Alvin R., L-5*
*Leep, Richard W., WX-8*
*Lopez, Jose O., DIR-SEC*
*Lopez, Manuel, SP-4*
*Lory, Minerva E., L-4*
*McClanahan, Sam, CMB-11*
*McClary, Jimmy F., C-3*
*Markham, Catherine, E-2*
*Marriott, Landis L., CMB-11*
*Martell, Calvin J., CMB-1*
*Martinez, Ernesto C., WX-7*
*Martinez, Robert B., SD-DO*
*Miller, Dan G., WX-3*
*Miranda, Gilbert A., CTR-9*
*Morse, Richard L., T-DO*
*Ohlsen, Gerald G., P-9*
*Ott, Martin A., CNC-11*
*Paciotti, Michael A., MP-3*
*Peterson, Ruth E., WX-3*
*Petrie, Eleanor L., WX-3*
*Phillips, Bobby J., CMB-11*
*Potter, James M., MP-4*
*Reading, Samuel L., L-6*
*Rein, James E., CMB-1*
*Reinig, Lloyd P., ENG-DO*
*Riebe, Clara H., J-16*
*Roberts, Maynard H., MP-13*
*Romero, Wilfred R., MP-8*
*Ross, John J., P-9*
*Roybal, Severiano, SP-3*
*Salazar, George A., C-1*
*Savage, John N., ENG-7*
*Schroer, John W., Jr., AO-7*
*Scott, Peter B., L-7*
*Shafer, Barry P., WX-6*
*Shelton, Robert N., L-8*
*Smith, Ronald H., E-1*
*Stewart, Bruce, L-3*
*Studebaker, Jan K., MP-1*
*Sul, Judith G., J-DO*
*Sullivan, Warren L., ENG-2*
*Swain, George R., MP-9*
*Terrell, Charles, CMB-6*
*Thomas, Arlo J., L-1*
*Thomas, Mary Ella, MP-DO*
*Tietjen, Gary L., C-5*
*Trujillo, Billy E., ISD-5*
*Vaughan, Larry L., WX-7*
*Velarde, Thomas R., ISD-7*
*Walsh, John M., M-DO*
*Walterscheid, Edward C., DIR-ADLL*
*Wewerka, Eugene M., CMB-8*
*Wilhelmy, Jerry B., CNC-11*
*Williams, Edward L., WX-6*
*Williams, Leevi D., H-7*
*Yates, George J., J-12*
*Zirkle, Gloria J., ENG-DO*

# Among Our Guests

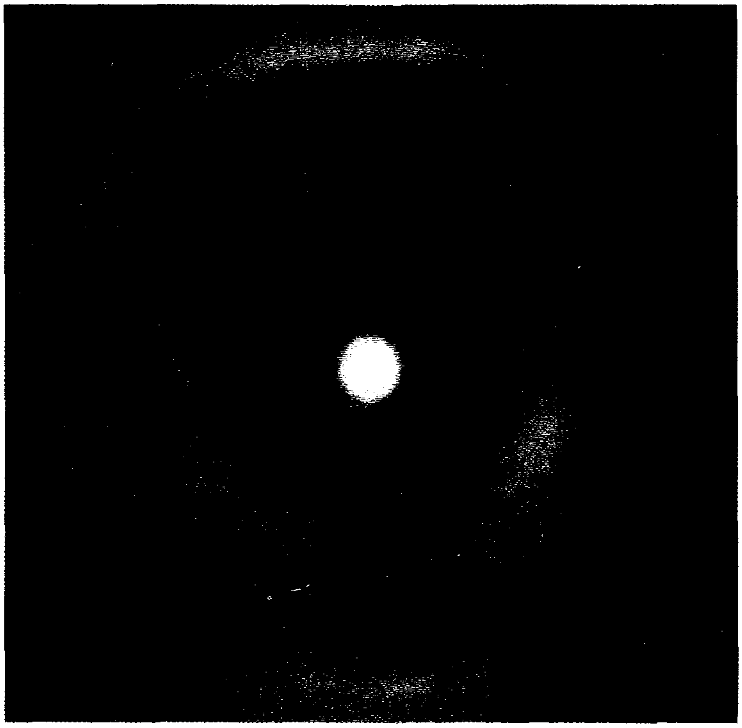
Here from the University of California during the week of Feb. 9 to gather material for a history of Los Alamos during World War II were Arthur Norberg, coordinator and writer for the project, left, and Robert Underhill, vice president emeritus and secretary of the Regents emeritus, right. Assisting in locating records was Walter Bramlett, ISD-5, center. Underhill negotiated the first and many subsequent University-U.S. government contracts.

Discussing the many ways LASL and the Association of Western Universities (AWU) have cooperated over the years are Donald Walker, AWU incoming executive director, left foreground, and Harold Agnew, Director, to his right. Others who participated in the February 23 meeting were, left to right, Victor Beard, AWU outgoing executive director; Richard Taschek, associate director for research; C. E. Roschek, ERDA-Washington, D.C.; and Emma Turley, AWU secretary.

Among those who welcomed U.S. Senator Joseph Montoya, center, to the Laboratory for a visit on February 13 to discuss LASL programs were Louis Rosen, MP-Division leader, left, and Duncan MacDougall, associate director for weapons, right. A reception was held in the Red Room.

Meeting with LASL personnel on March 1 was a delegation of U.S. Office of Management and Budget (OMB) and U.S. Energy Research and Development (ERDA) officials. Three members were, left to right, James Mitchell, OMB, associate director, natural resources, energy, and science; Major General Joseph Bratton, ERDA, director division of military application; and Louis Alder, ERDA, deputy controller, office of the controller.

MOTZ HENRY THOMAS
3187 WOODLAND RD
LOS ALAMOS NM
87544



On February 27, photographer Henry Ortega, ISD-7, on assignment at the Meenie firing site, noticed a fine example of a halo around the sun and recorded it on film. Snowflakes or ice crystals in high cirrus clouds refract light like prisms, producing the effect. For more on how other LASL employees are looking to the skies, see the article beginning on page 1.